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THE TRANSMISSION OF TYPHUS FEVER, WITH ESPECIAL REFERENCE TO TRANSMISSION BY THE HEAD LOUSE (*PEDICULUS CAPITIS*).

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In a recent paper¹ we showed that Brill's disease, which is apparently endemic in New York City, is identical with the typhus fever of Mexico, and as it is reasonably certain that the New York disease is of European origin we also concluded that the typhus of Europe and that of Mexico are identical. During the progress of the experiments necessary for the foregoing demonstration of the identity of the so-called Brill's disease and Mexican typhus we took up the study of various related problems. These studies were carried out concurrently in Mexico and at the Hygienic Laboratory in Washington.

At this time we desire to present the results of some of our work on the mode of transmission of this disease. Before presenting the details of this work it will be desirable to briefly review the present status of our knowledge of the transmission of typhus fever.

Nicolle, Comte, and Conseil² were the first to demonstrate insect transmission of typhus fever. In September, 1909, they reported the successful transmission of typhus fever from one bonnet monkey (*M. sinicus*) to two others by means of the body louse (*Pediculus vestimenti*). In this paper they showed that body lice that had fed upon an infected monkey were able to convey typhus fever some time between the first and the seventh day thereafter.

Independently of Nicolle, Comte and Conseil, Anderson and Goldberger,³ beginning their work on this problem in November, 1909, reported two attempts to transmit Mexican typhus from man to monkey by means of the bite of the body louse in February, 1910. In one of their experiments one of the monkeys showed a slight elevation of temperature 8 days after the last exposure to the bites of the infected lice. Unfortunately, circumstances prevented their making an immunity test; but in the light of later studies it seems probable that the elevation of temperature was due to infection with typhus.

Ricketts and Wilder,⁴ also working in Mexico, reported in April, 1910, that they were able to transmit the virus of typhus fever by

¹ Anderson, John F., and Goldberger, Joseph: The relation of so-called Brill's disease to typhus fever. An experimental demonstration of their identity. Public Health Reports, vol. 27, Feb. 2, 1912, p. 149.

² Nicolle, Charles; Comte, C.; and Conseil, E.: Transmission experimentale du typhus exanthématique par le pou du corps. C. R. des Acad. Sci., vol. 149, Sept. 6, 1909, p. 486.

³ Anderson, John F., and Goldenberger, Joseph: On the infectivity of tabardillo or Mexican typhus for monkeys and studies on its mode of transmission. Public Health Reports, vol. 25, Feb. 18, 1910, p. 177.

⁴ Ricketts, Howard T., and Wilder, Russell M.: The transmission of the typhus fever of Mexico (tabardillo) by means of the louse (*Pediculus vestimenti*). Journ. Am. Med. Assn., vol. 54, Apr. 16, 1910, p. 1304-1307.

means of the bite of the body louse from man to monkey and from monkey to monkey. They also reported the successful transmission of typhus virus to the monkey by introducing into scarifications of the skin the abdominal contents of some infected lice. They record the interesting observation that, as a rule, in their louse experiments, the monkeys had no very significant temperature reaction and that proof of infection was dependent upon immunity tests with virulent blood.

In July, 1911, Wilder¹ reported additional experiments on infection of monkeys with body lice by biting and intradermal inoculation.

In January, 1911, Nicolle and Conseil,² continuing their work of September, 1909, report further successful experiments on the transmission of typhus fever to the bonnet monkey by means of the bite of infected body lice.

EXPERIMENTAL.

Body lice (Pediculus vestimentis).

The first experiments we wish to report were made with body lice.

Experiment No. 1.—A number of body lice were collected from the clothes of healthy persons and on the afternoon of October 18, 1911, were applied to the belly of rhesus No. 158. They were again allowed to feed on No. 158 in the morning and afternoon of October 19, and again in the morning of October 20. In the afternoon of October 20 and thereafter twice daily up to and including October 22 they were fed on rhesus No. 157. Rhesus No. 157 and No. 158 were both sick at this time with typhus fever (New York virus—Brill's disease). After having fed in diminishing numbers on 5 successive days on sick monkeys the lice were applied to a fresh monkey, rhesus No. 127, in the morning and afternoon of October 23 and twice daily thereafter up to and including October 29, when feeding was discontinued. At this time 22 of the lice were still alive and were used in experiment No. 2. During the experiment the lice were kept at a temperature of 15° to 18° C.

Rhesus No. 127 was kept under observation for 37 days after the last feeding, when the animal was given an immunity test by inoculation with virulent blood. After 9 days incubation rhesus No. 127 developed typhus fever, indicating that the animal had not been infected by the previous biting of the lice.

Experiment No. 2.—The lice used in experiment No. 1 were killed with chloroform vapor on October 30, the day after their last feed on rhesus No. 127. They were then ground in a mortar with salt solution and injected subcutaneously into rhesus No. 137. Forty-three days later, having in the meantime given no evidence of infection with typhus fever, this monkey was given an immunity test consisting of an injection of virulent blood (New York virus). To this it responded after 9 days incubation with a typical attack of typhus fever, showing that the injection of crushed lice killed with chloroform vapor had not infected rhesus No. 137 with typhus.

Experiment No. 3.—On October 27 about 150 body lice were obtained from the clothes of healthy persons and applied to the

¹ Wilder, Russell M.: The problem of the transmission of typhus fever, *Journ. Infec. Dis.*, vol. 9, July, 1911, p. 9-101.

² Nicolle, Charles, and Conseil, C.: Etiologie du typhus exanthematique. *Ann. de l'Inst. Pasteur*, vol. 25, p. 68-78.

belly of rhesus No. 139 in the afternoon of the same day. Twice daily thereafter up to and including the morning of October 31, they were allowed to feed on rhesus No. 139. In the afternoon of October 31 and in the morning and afternoon of November 1 they fed on rhesus No. 95. Rhesus Nos. 139 and 95 were at this time both sick with typhus, induced by blood inoculation with the New York virus (Brill's disease). From November 2 up to and including November 9 they were fed twice daily on rhesus No. 165, a fresh monkey. When the feedings were discontinued on November 9 only 9 lice remained alive. Throughout this experiment the lice were kept at 15° to 18° C.* Chart No. 1 shows the temperature curve of rhesus No. 165 from the first feeding by infected lice on November 2 up to the time of the animal's death. Eleven days after the first and 4 days after the last feeding by infected lice the temperature of rhesus No. 165 began to rise and remained elevated 4 days, when it fell below its normal range. Ten days later the animal apparently had a relapse lasting 3 days. From this time on the animal progressively failed, and death occurred on December 8. At the autopsy no macroscopical changes were noted in any of the organs. An attempt at passage on the first day of what we interpret as typhus fever, with the blood of this animal, using washed corpuscles, failed.

In spite of the failure at passage (compare experiment No. 7 below), we believe it is permissible to conclude that the rise in temperature of rhesus No. 165, beginning on November 13, was due to infection with typhus (Brill's disease), following the bite of infected lice from 4 to 11 days previously.

Experiment No. 4.—On November 2, 6 days after their first and 1 after their last infecting feed, 10 of the lice used in experiment No. 3 were killed with chloroform vapor, ground in a mortar with salt solution, and injected subcutaneously into rhesus No. 145. Having given no evidence of a constitutional reaction, the immunity of this animal was tested 40 days after the injection of the crushed lice by an injection of virulent typhus blood (New York virus). The monkey developed fever after 8 days' incubation, indicating that infection with typhus had not resulted from the subcutaneous injection of crushed lice killed with chloroform vapor.

Experiment No. 5.—About 9.30 a. m. on December 3, 83 body lice (*Pediculus vestimenti*) of group No. 7-M¹ and 83 of group No. 8-M were mixed, crushed in a mortar, and ground up in saline solution. Of this suspension 3.5 c. c., representing about 35 body lice, was subcutaneously injected into rhesus No. 308 and 1.5 c. c., representing about 15 lice, into rhesus No. 309.

Body lice of group No. 7-M had been allowed to feed daily during the 6 days immediately prior to the date of the experiment on various cases of typhus fever in the Hospital General, Mexico City. They were last applied to case No. 16-M, in the eleventh day of illness, at 10.50 to 11.20 a. m. December 2.

Body lice of group No. 8-M were insects that had been allowed to feed daily during the 5 days immediately preceding the date of the experiment on various cases of typhus fever. They were last applied to case No. 16-M, in the eleventh day of illness, at 10.20 to 10.50 a. m.

¹ M=Mexican series; N=New York series.

December 2. Throughout the experiment these lice were kept at room temperature (about 14° to 24° C.).

Following the foregoing inoculations a slight redness of the skin developed at the site of injection in rhesus No. 308. This was incised about 24 hours after inoculation, but no pus was found. In the case of rhesus No. 309 some redness and swelling developed at the site of injection, which was incised 24 hours after the injection and a small amount of pus evacuated. During the period of observation of both animals no evidence of a febrile reaction was noted in either.

On January 10, 1912, or 38 days after their inoculation with the crushed-lice suspension, having in the meantime been returned to the Hygienic Laboratory, the two monkeys were given an immunity test, each animal receiving 3 c. c. of defibrinated blood of rhesus No. 187 (New York virus) intravenously. Following this inoculation both animals reacted sharply, No. 308 after an incubation period of 8 and No. 309, of 9 days.

The inoculation of these two animals with the crushed-lice suspension had, therefore, been without appreciable result.

Experiment No. 6.—The preceding experiment was repeated on December 10, with 73 body lice (*P. vestimenti*) of group No. 9-M. The body lice composing this group were variously applied and fed on cases of typhus fever at the Hospital General, Mexico City, during the 6 days immediately prior to the date of the experiment. Throughout this period they were kept at room temperature (14° to 24° C.). They were last applied on December 9, between 10.15 a. m. and 12 m., to case No. 19-M, in the seventh day of illness. About 29 hours later, namely, December 10, at 5.30 p. m., they were crushed and rubbed up in saline solution and at 8.05 p. m. subcutaneously injected in rhesus No. 320. During the subsequent period of observation monkey No. 320 gave no evidence of a reaction.

On January 10, 1912, 31 days after the injection of the crushed-lice suspension, having in the meantime been returned to the Hygienic Laboratory, this animal was given an immunity test consisting of an injection of 3 c. c. of defibrinated blood of rhesus No. 187 (New York virus), part intravenously and part subcutaneously. Twenty-one days later, namely, January 31, having in the meantime given no indication of a reaction, he was given a second immunity test, consisting of 2.5 c. c. of defibrinated blood of rhesus No. 115^a (New York virus) intravenously. During a period of observation of 23 days following this inoculation no evidence of a reaction developed. At each test a pair of fresh monkeys were inoculated as controls, and in each instance one of the respective pairs developed fever. Although only one of each pair of controls reacted, we believe it more than probable that the failure of monkey No. 320 to react was due to an immunity conferred by the previous injection with crushed-lice suspension.

Head lice (Pediculus capitis).

Although all the important features of the epidemiology of typhus are satisfactorily explained on the basis of its transmission by means of the body louse (*P. vestimenti*), nevertheless, on account of the close relationship between this insect and the head louse (*P. capitis*), it seemed desirable to test the possibility of the transmission of the disease by this latter species.

Our first experiment with head lice was made to determine whether the virus of typhus was capable of retaining its virulence as long as 20 to 24 hours in the body of this insect.

Experiment No. 7.—On November 14, 1911, 17 lice of group No. 1-M were crushed and rubbed up in saline solution and then, after a moment's standing to allow the coarse particles to settle, the suspension was injected subcutaneously into rhesus No. 306. The lice of group No. 1-M were obtained from the hair clipped from the scalp of case No. 4-M on November 12, on admission to the typhus ward of the Hospital General, Mexico City. At the time of admission this patient was in the eighth day of his disease. At 10 a. m., November 13, these insects were applied to a patient (case No. 1-M) in the thirteenth day of a well-marked attack and 15 of the insects fed. At 11.30 a. m., November 14, 12 of the 17 lice were still living. Both the living and the dead, 17 in all, were, as above recited, crushed and injected into rhesus No. 306. During the progress of the experiment the insects were kept at room temperature (14° to 24° C.).

On the following day, November 15, 23 lice of group No. 2-M, after being crushed and rubbed up as were those of group No. 1-M, were subcutaneously injected into the same monkey—rhesus No. 306. The lice of group No. 2-M were collected from the hair clipped from the scalp of a patient (case No. 5-M) in the eighth day of a well-marked attack of typhus at the time of admission to the typhus pavilion, namely, about 3.30 p. m., November 14, 1911. These head lice were kept at air temperature (14° to 24° C.) until 11.30 a. m. of the next day, when 13 were found alive and 10 dead. At this time, at least 20 hours from the last possible feed, these lice, both living and dead, were crushed and subcutaneously injected into rhesus No. 306. Following this injection there was practically no local reaction, but the temperature of the animal rose rapidly (see chart No. 2), reaching 41.1° C. on November 16. It dropped with equal rapidity to normal, where it remained until November 21. In the afternoon of this day, or 7 days after the first and 6 days after the second injection, the temperature of the animal again rose and remained elevated for 7 days. At the end of this period it declined rapidly to normal, where it has remained.

An attempt at passage from the monkey was made on November 23, about 48 hours after the second rise in temperature. Blood was aspirated from the heart, at once defibrinated, and 3 c. c. injected intravenously into rhesus No. 314, a fresh monkey; but during a subsequent period of 29 days this animal gave no evidence of a reaction. This failure to effect passage made it necessary to subject rhesus No. 306 to an immunity test in order to determine definitely the nature of the febrile reaction following the above inoculation with head lice.

On December 29, therefore, rhesus No. 306 was given an intraperitoneal injection of 6 c. c. of defibrinated blood from case No. 35-M, diluted with an equal volume of saline solution. Three days later the animal was given an additional intraperitoneal injection of 4 c. c. of defibrinated blood of case No. 39-M, likewise diluted with an equal volume of saline solution. Following these inoculations the temperature of the monkey has remained normal, though two others (rhesus Nos. 324 and 304) inoculated with identical quantities of the same specimens of blood on the same dates have given prompt and

sharp febrile reactions, testifying to the virulence of at least one of the specimens used for their inoculation.

We conclude, therefore, that the febrile reaction beginning November 21 suffered by rhesus No. 306 was due to infection with the typhus virus in the bodies of the head lice with which it was inoculated.

Although the typhus virus may retain its virulence in the body of the head louse for at least 20 to 24 hours, as shown in the foregoing experiment, it does not necessarily follow, though strongly suggested, that this louse is capable of transmitting the disease in the normal way, namely, by biting. The following experiments with head lice were made, therefore, to test this point:

Experiment No. 8.—On November 16, 1911, at 12 m., 25 head lice of group No. 3 were applied to the shaved belly of rhesus No. 302 and 15 of them fed. At 4.30 p. m. this group of lice was reapplied and again 15 fed. After this the lice were applied to rhesus No. 302 twice daily in rapidly diminishing numbers till November 19, in the afternoon of which date a solitary survivor was given its last feed.

The lice of group No. 3—M were head lice collected from the heads of 3 typhus patients (cases 6—M, 7—M, and 8—M) in the afternoon of November 15, at the time of their admission to the typhus ward of the Hospital General, Mexico City. From the time they were collected these insects were kept at room temperature (about 14° to 22° C.).

In addition to the foregoing rhesus No. 302 was subjected to the bites of two lice constituting group No. 4—M in the forenoon and afternoon of November 18. Thereafter, twice daily, a single survivor of this group was applied until the morning of November 20, when this insect obtained its final feed. The two lice constituting group No. 4—M were obtained from the hair of the head of case No. 9—M at about 3 p. m. of November 17 on admission to the typhus ward. Two hours later they were reapplied to this patient and both fed. Following this they were kept at room temperature (about 14° to 22° C.).

During a period of observation of 30 days subsequent to the last inoculation by the bite of the survivor of lice group No. 4—M rhesus No. 302 gave no appreciable reaction. On December 22, or 32 days after being last bitten, this monkey was subjected to an immunity test by receiving an intraperitoneal injection of 4.5 c. c. of defibrinated blood of case No. 26—M, diluted with an equal volume of normal saline solution. At the same time and with some of the same blood, monkeys Nos. 314, 315, and 316 were similarly inoculated. Nos. 314 and 316 each receiving 4.5 c. c. and No. 315, 5 c. c., likewise diluted with equal volumes of saline solution. Of these 4 animals No. 302 was much the smallest, No. 315 very much the largest, while Nos. 314 and 316 were intermediate in size between Nos. 302 and 315. It follows, therefore, that although Nos. 314 and 316 received the same amount of blood as No. 302 and No. 315 about 0.5 c. c. more, rhesus No. 302 actually received a relatively larger dose. Nevertheless, rhesus No. 302 is the only one of the 4 animals that failed to give any evidence of a reaction (see charts Nos. 3, 4, 5, and 6). Rhesus No. 314 gave a prompt and well-marked reaction. This animal, it will be recalled, was previously used for the unsuccessful attempt at passage from rhesus No. 306. Rhesus No. 315 presented a well-defined but mild reaction, while No. 316 gave indications of a brief abortive reaction

that was at its height (40° C.) on the tenth day after inoculation. Both these animals had been subjected to a previous inoculation with typhus fever blood, each having received an intravenous inoculation of 2.5 c. c. of defibrinated blood from a patient (case No. 16-M) in the eleventh day of a sharp attack and when the fever was already falling.

The foregoing test would indicate, therefore, that rhesus No. 302 had developed a resistance to infection with virulent typhus blood as the result of having been bitten by head lice of groups Nos. 3-M and 4-M.

On account of the importance of the question involved it was thought desirable to give rhesus No. 302 a second immunity test. Accordingly on February 1, having been returned to the Hygienic Laboratory, he was given an intravenous injection of 2.5 c. c. of typhus blood (New York virus). At the same time rhesus Nos. 315 and 316 that had served as controls in the previous test were similarly inoculated. Following this inoculation none of these animals gave any appreciable evidence of reaction, although two other monkeys, Nos. 198 and 322, inoculated at the same time, reacted promptly and sharply, testifying to the virulence of the blood used for the test. The result of this test is in harmony with and confirms the result of the previous one and therefore strengthens the conclusion that the resistance of rhesus No. 302 to the immunity test was due to the bites of the head lice to which he was previously subjected.

Experiment No. 9.—Shortly after the lice-feedings on rhesus No. 302 had terminated, a series of feedings with lice of group No. 5-M and group No. 6-M were begun on rhesus No. 304. The lice constituting these groups were obtained from the hair clipped from the scalp of case No. 11-M and of case No. 12-M November 20, 1911, on admission to the typhus ward. One portion of these lice (group No. 5-M) was applied about 24 hours later to rhesus No. 304, 54 of the insects feeding. Thereafter they were applied daily in rapidly diminishing numbers until the morning of November 26, when a single survivor was given its last feed.

Another portion, 18 in all, of the head lice from cases No. 11-M and No. 12-M (group No. 6-M) were reapplied to case No. 11-M on November 21, or about 24 hours after they were isolated. On the succeeding day they were applied to the monkey and thereafter were applied twice daily in diminishing numbers until the afternoon of November 26, when a single survivor of the group obtained its last feed. Throughout the experiment the lice were kept at room temperature (about 14° to 24° C.). During a period of observation of 32 days following the last exposure to the bites of groups Nos. 5-M and 6-M this animal gave no indication of a reaction. On December 29, or 33 days after the last exposure, this animal was given an intraperitoneal injection of 6 c. c. of defibrinated blood of case No. 35-M diluted with an equal volume of saline solution. Three days later rhesus No. 304 received an additional intraperitoneal injection of 4 c. c. of defibrinated blood from case No. 39-M, also diluted with an equal volume of saline solution. Following this inoculation the animal very promptly developed a sharp reaction of 10 to 11 days' duration. The result of this immunity test indicates that the repeated bites of the head lice of groups Nos. 5-M and 6-M failed to confer any resistance to a subsequent inoculation with virulent typhus blood.

Experiment No. 10.—In this experiment two groups of head lice (Nos. 15-M and 17-M) were repeatedly applied and allowed to feed on rhesus No. 322. Group No. 15-M was isolated in the afternoon of December 19, 1911, from the hair clipped from the scalp of case No. 26-M, a patient in the ninth day of an attack of typhus fever. They

were kept until the following day at room temperature (14° to 22° C.). At 12.45 p. m. December 20 they were applied to case No. 27-M, a patient in the twelfth day of an attack of typhus. About 3 hours and 20 minutes later these lice, 37 in all, were for the first time applied and allowed to feed on rhesus No. 322. After this they were applied twice daily in rapidly diminishing numbers until December 26, when only 2 survivors remained.

Group No. 17-M was isolated from the hair clipped from the scalp of case No. 28-M, a patient in the tenth day of an attack of typhus, in the afternoon of December 20, 1911. At 11.30 a. m. of the following day these lice were reapplied to case No. 28-M, now in the eleventh day. Four hours later they were applied for the first time to rhesus No. 322, 15 feeding on this occasion. Thereafter, these lice were applied twice daily in rapidly diminishing numbers until December 16, when only 2 survivors remained. Throughout the experiment the lice were kept at room temperature (about 14° to 22° C.).

During a subsequent period of 25 days this animal gave no indication of a reaction. Thirty days after the final application of the lice, namely, on February 1, 1912, this monkey was given an immunity test consisting of an intravenous inoculation of 2.5 c. c. of defibrinated blood of rhesus No. 184 (New York virus). After an incubation period of 8 days this monkey developed a sharp reaction, indicating that the lice had failed to transmit the infection and confer immunity.

SUMMARY.

I.

(a) In one of two attempts to transmit typhus fever (New York virus—Brill's disease) from monkey to monkey

by means of the bite of the body louse (*Pediculus vestimenti*) the monkey bitten by the presumably infected lice developed a fever of short duration followed by a relapse and later progressive emaciation, and death, with no macroscopic lesions at necropsy.

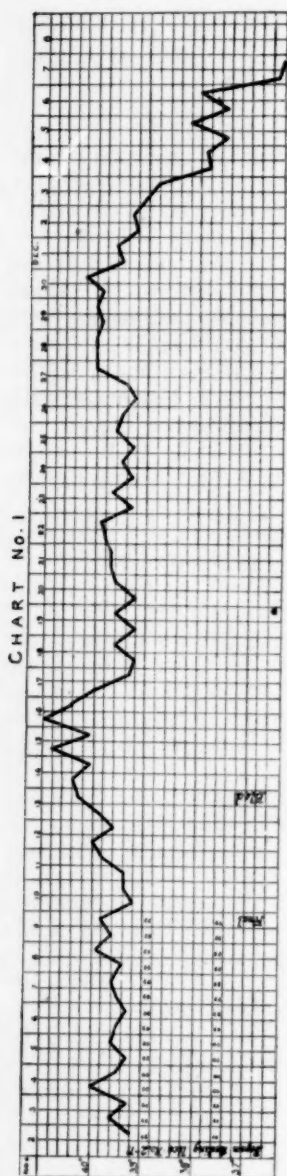


CHART No. 1.—Temperature curve of rhesus No. 165, infected by bites of body lice No. 2-N.

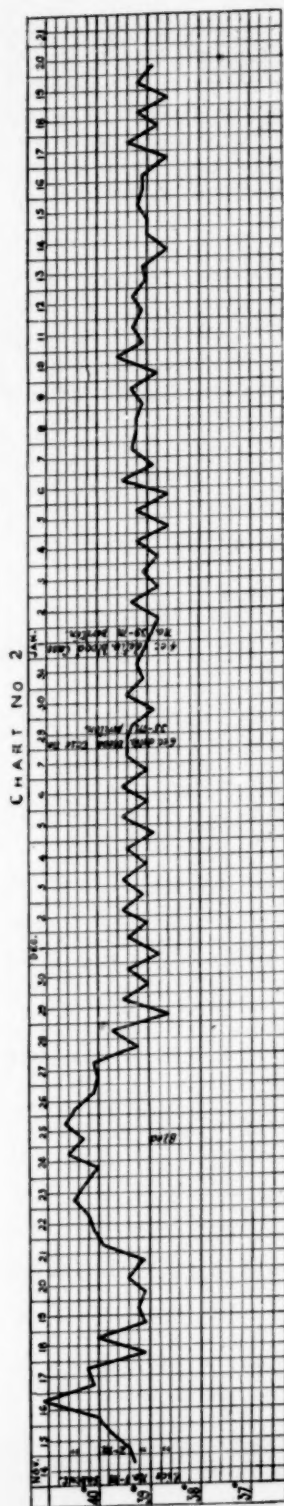


CHART No. 2.—Temperature curve of rhesus No. 306 after inoculation by subcutaneous injection of head lice No. 1-M and No. 2 M, and after immunity test.

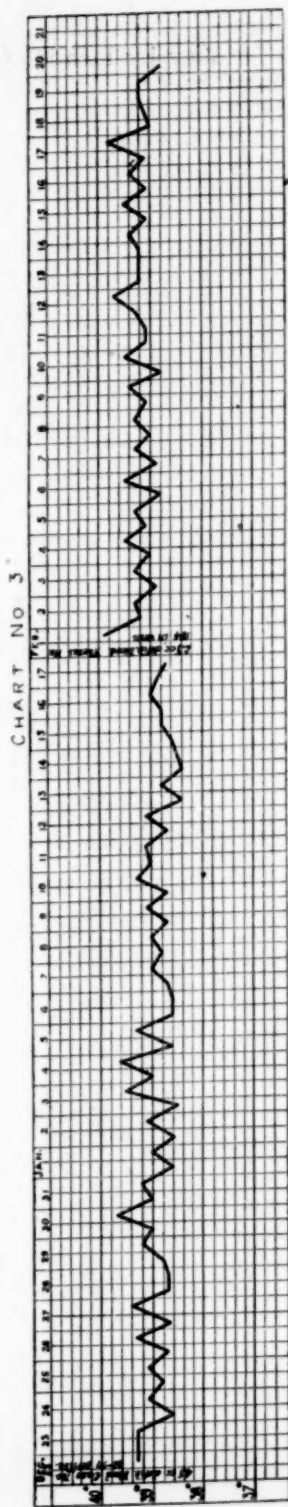


CHART No. 3.—Temperature curve of rhesus No. 302 after the first and the second immunity tests.

(b) Two attempts to transmit typhus fever (New York virus) from monkey to monkey by means of subcutaneous injections of suspensions of chloroformized and crushed lice resulted negatively.

(c) In one of two attempts to transmit typhus fever (Mexican virus) from man to monkey by means of subcutaneous injection of a saline suspension of crushed body lice, the monkey so inoculated has resisted two subsequent inoculations with virulent typhus blood (New York virus).

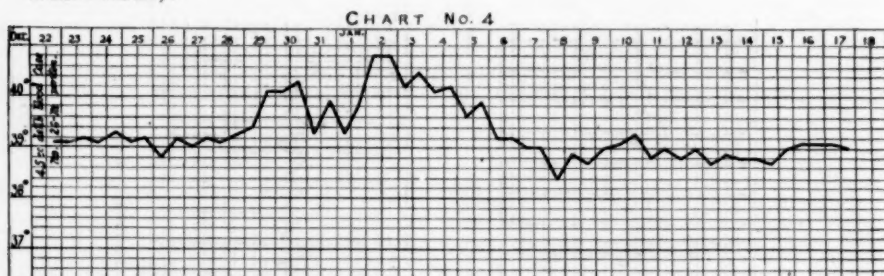


CHART No. 4.—Temperature curve of rhesus No. 314 following immunity test; control on rhesus No. 302.

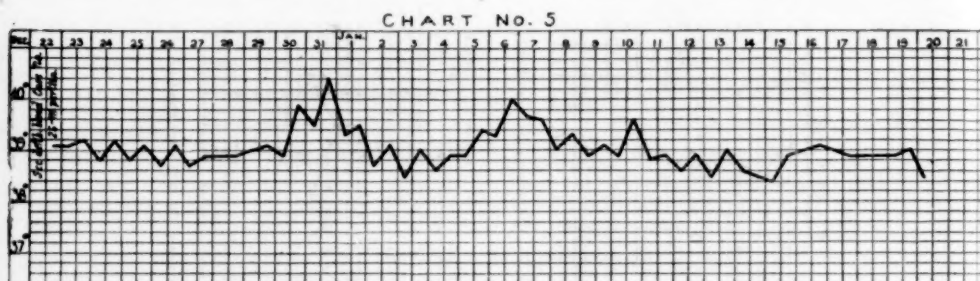


CHART No. 5.—Temperature curve of rhesus No. 315 following immunity test; control on rhesus No. 302.

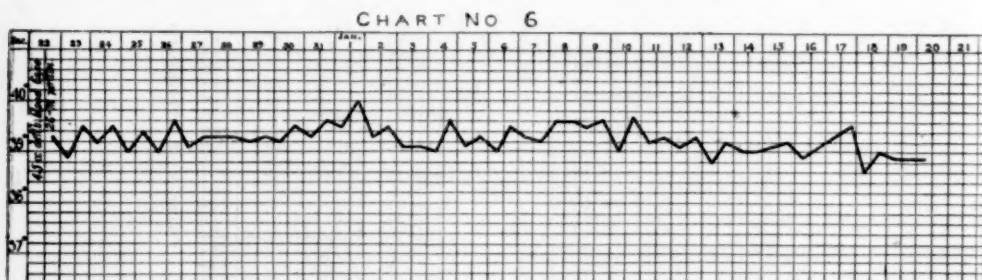


CHART No. 6.—Temperature curve of rhesus No. 316 following immunity test; control on rhesus No. 302.

The foregoing results are in harmony with and confirm those reported by previous workers.

II.

In this paper we present the first evidence incriminating any insect other than the body louse as an intermediary in the transmission of typhus fever:

(a) In an attempt to transmit typhus fever (Mexican virus) from man to monkey by subcutaneous injection of a saline suspension of

crushed head lice (*Pediculus capitis*), the monkey developed a typical febrile reaction with subsequent resistance to an inoculation of virulent typhus (Mexican) blood.

(b) In one of three experiments to transmit typhus fever (Mexican) from man to monkey by means of the bite of the head louse (*Pediculus capitis*), the animal bitten by the presumably infected head lice proved resistant to two successive immunity tests with virulent typhus blood.

CONCLUSIONS.

1. The body louse (*Pediculus vestimenti*) may become infected with typhus. The virus is contained in the body of the infected louse and is transmissible by subcutaneous injection of the crushed insect or by its bite.

2. The head louse (*Pediculus capitis*) may become infected with typhus. The virus is contained in the body of the infected louse and may be transmitted by subcutaneous injection of the crushed insect and, we believe, also by its bite.

ACKNOWLEDGMENTS.

We desire to renew our acknowledgments of indebtedness to Drs. Nathan E. Brill and Leo Kessel, of New York City, and to Dr. Leon Louria, of Brooklyn, for cases of Brill's disease; to Dr. Eduardo Licéaga, president, and Dr. Octaviano Gonzalez Fabela, director of the bacteriological laboratory of the Superior Board of Health of Mexico; to Dr. Regino Gonzalez, director of the Hospital General; Dr. German Diaz Lombardo, director of the Hospital Juarez, and Drs. Miguel Otero and Zenon Luna, for laboratory and clinical facilities; for many valuable courtesies to Dr. A. R. Goodman, chief surgeon of the national railways of Mexico, and Drs. Genaro Escalona, Felipe Perez Garza, J. R. Davis, and Señor Salvador Aguirre.

SCHOOL CLOSURE IN THE CONTROL OF EPIDEMICS OF MEASLES.

The control of outbreaks of measles has usually been found difficult. This has been so to such an extent that in many cities no attempt at control is made. Under these circumstances the disease very probably subsides only after it has attacked a considerable proportion of the susceptible children and remains in a state of relative inactivity until a sufficient number of other children reach an age when their relation to the community life makes them available material for a new epidemic.

Studies of outbreaks of measles and of the effect of measures aimed at their control are of special interest to municipal health authorities. Dr. Raffle, school medical officer of South Shields, England, reported in the *Lancet* (London) of February 3, 1912, an outbreak of measles in which the closing of the schools seemed to have a decided limiting effect on the spread of the infection. The following is the report:

SCHOOL CLOSURE IN MEASLES.

To those working on the preventive side of medicine school closure as a means of controlling epidemics is always an interesting question. Opinions differ as to its efficacy even amongst medical men, and the present article is an account of how it

worked in an epidemic of measles. Laymen, especially members of education committees, often meet our arguments in favor of school closure with the retort that the children are just as liable to be infected in their home life as they are to be infected in school. The intercourse in the home, the street, the Sunday school, and places of amusement plays, of course, its part in the spread of infectious disease, but I hope to show that in the epidemic which is here considered it was a minor part.

During the spring and early summer of last year we had to control an extensive epidemic of measles, which affected 15 out of 21 of our infant schools. There were 858 children attacked, and each of the cases has been investigated for the purpose of a special report to be included in the annual report for 1911. I have analyzed the figures of incidence in each school in the hope that other school medical officers will follow my example and give the profession figures of proof of the efficacy of school closure. The accompanying table shows the departments affected, the extent to which they were closed, the rough average attendance of the department, the number of children who had not already had measles (from figures obtained during three years of medical inspection), the number of cases occurring before closure, the number occurring within 14 days of closure, and the number which occurred more than 14 days after the closure.

Table showing the influence of school closure in an epidemic of measles.

Name of school.	Extent of closure.	Average attendance.	Number of susceptible children.	Number of cases before closure.	Number of cases within 14 days after.	Number of cases more than 14 days after.
Westoe.....	All.....	480	240	77	27	17
Ocean Road.....	do.....	380	190	51	16	7
St. Hilda's.....	do.....	170	80	19	1	2
St. Stephen's.....	do.....	175	80	18	0	5
Gilbert Street.....	do.....	400	200	71	28	20
Barnes.....	do.....	440	210	37	8	0
Baring Street.....	do.....	450	220	49	16	1
Mortimer Road.....	do.....	520	250	76	18	3
W. Harton.....	do.....	200	100	28	6	1
Cone Street.....	do.....	310	150	22	1	8
H. Trinity.....	do.....	345	170	51	10	6
Laygate Lane.....	Classes 5, 7, and 8.....	150	70	21	0	2
St. Bede's.....	Classes 6 and 7.....	100	40	28	1	2
Stanhope Road.....	Class N 2.....	50	20	22	0	0
Mowbray.....	Classes 7, 8, 9, 9A, and 10.....	300	160	48	8	1
Total.....		4,470	2,180	618	140	75

We must take into account, as I have already said, both the infection which may be present in the home life and that in the school life. If we eliminate one of these sources of infection we can then ascertain the part played by the other in spreading the disease, providing that we have remaining, after one source has ceased to act, a large number of susceptible children. During the period that a child is at school both sources of infection are in operation, and for a period of 14 days after the child is excluded it is still possible that the child was infected at school and has been carrying the undeveloped disease in its system. After the maximum period of incubation has expired all cases occurring amongst the children must be the result of infection in the home life.

There were in this epidemic 4,470 children exposed to infection, and of these 2,180 were susceptible to measles. Of these, 853 children were attacked, 638 cases occurring during the time that the children were at school and 140 during a period of 14 days after the school was closed; that is, 778 cases which might have been infected either at school or in the home life. Thus, at the time of the removal of the possibility of the infection at school there were still more than 1,400 children who were susceptible to measles. Only 75 of these children actually contracted the disease. This shows, I think, the important part played by the school in the spread of the infection of measles and the value of school closure in this epidemic as a preventive measure.

UNITED STATES.

MUNICIPAL ORDINANCES, RULES, AND REGULATIONS PERTAINING TO PUBLIC HYGIENE.

[Adopted since July 1, 1911.]

FARGO, N. DAK.

COMMUNICABLE DISEASES—NOTIFICATION, QUARANTINE, ISOLATION, DISINFECTION,
SCHOOL ATTENDANCE OF CASES, AND CONTACTS.

SECTION 1.—*Report of cases.*

A.—All contagious and infectious diseases to be reported to the health officer.

1. Every physician who attends any person in the city of Fargo affected with scarlet fever, smallpox, diphtheria, measles, typhoid fever, pulmonary tuberculosis, anterior poliomyelitis, epidemic cerebro-spinal meningitis, chicken pox, whooping cough, or mumps shall report the same within 24 hours from the time of such attendance to the health officer, in writing, on cards furnished by the health department, giving the name of the disease, the name, age, sex, and color of patient, and the number and name of the street, or shall otherwise designate the location of the house or dwelling place where such patient may be found. A report by telephone shall be required in addition in the case of persons affected with scarlet fever, diphtheria, or smallpox.

2. In the absence or disability of any physician in attendance on such case, or in default of such physician, the head of the family or some other member of the family to which the patient belongs, shall make a report as specified in paragraph 1.

3. Hotel and boarding-house keepers, managers of public or private institutions, and teachers in public and private schools, and, finally, any person who is aware of the existence of any of the diseases enumerated, where there is no physician in attendance, or where the case has not been reported, shall make a report of the same to the health officer, as specified in paragraph 1 of this section.

B.—Separate reports required for each case.

1. Every physician or other person as specified in section 1 shall make separate reports for each and every case occurring in the same family or in the same dwelling place.

C.—Suspected cases to be reported.

1. Any physician who attends any person whom he suspects of being ill of any of the diseases enumerated in section 1, but on whom he is not able to make a positive diagnosis at the time of the first visit, shall report the same to the health officer as a suspicious case, on the card furnished by the health department. Such a case will not be placarded unless a warranting diagnosis is later established. When the diagnosis is established, the physician shall immediately notify the health officer. In suspected cases the physician in attendance shall inform the family and others living in the same dwelling place as the patient, of the probable nature of the disease, and shall instruct them in the maintenance of the same precautions which are prescribed when the diagnosis is positive.

D.—Death or recovery from contagious disease to be reported to the health officer.

1. When any person ill of any contagious disease recovers or dies the attending physician shall at once notify the health officer. In the case of the death of the patient, the report shall be made in writing on blanks provided for that purpose. But no person shall certify knowingly or negligently that any person has recovered from any disease aforesaid until such patient is in such condition as to be free from danger of communicating the disease to other persons.

SECTION II.—*Quarantine and isolation.*

A.—*Quarantine to be established in certain cases.*

1. Immediately upon receiving notice of the existence of any of the diseases enumerated in section I the health officer shall investigate the same and shall take such measures as hereinafter provided to prevent the spreading of such disease.

2. The health officer shall remove or cause to be removed any patient affected with scarlet fever, diphtheria, smallpox, or epidemic cerebro-spinal meningitis to the city quarantine hospital, or shall establish, or cause to be established, proper quarantine at the dwelling place of the person so affected, provided that house quarantine can be carried out without danger to the general public.

3. The expenses of hospital quarantine shall be borne by the patient when the patient is able to pay them, otherwise the expenses shall be borne by the city in accordance with section 23 of the Revised Ordinances of the City of Fargo.

4. In cases of house quarantine a warning card shall be so displayed on the front and rear entrances that anyone coming to either door will be warned of the presence of the disease within.

5. No person who has been in contact with a person having any of the above-named diseases, excepting the attending physician or a health officer, shall leave the premises or come in contact with anyone other than the patient unless properly disinfected, and permitted to do so by the health officer.

6. The members of the family who work out must either (a) board and room at another house, or (b) stop work and stay in the house.

7. The health officer may after personal investigation of the premises wherein a contagious case or cases exist, issue a written permit to wage earners to enter and leave the premises during the period of quarantine, providing that he finds that such a modification of quarantine will not endanger the public health. Neither this nor any other modification of quarantine will be permitted excepting with the written consent of the health officer, and no modification of quarantine will be allowed in the case of any wage earner who is engaged in the production, sale or manufacture of wearing apparel, bedding, foodstuffs, cigars, cigarettes, or candy. If he is so employed he shall be required to take a disinfecting bath and put on disinfected clothing and leave the premises.

8. Milkmen must empty milk delivered to infected premises into covered containers placed outside the door of such premises. They must not enter such premises nor remove milk bottles therefrom until the house has been fumigated and the bottles have been sterilized. If bottles are delivered they must not be taken from the house until the case is terminated and the bottles have been sterilized.

9. Grocymen and other persons delivering merchandise are forbidden to enter such premises or remove packages therefrom.

10. Laundrymen are forbidden to enter such premises or to remove any clothing therefrom until such articles have first been boiled or otherwise sterilized.

11. No one shall remove anything from such premises except by permission of the health officer.

No one shall enter any infected portion of such premises except physicians and health inspectors except by permission of the health officer.

12. No cat, dog, or other household domestic animal shall be allowed to run in and out of the house during the quarantine period. These animals must be either kept inside or tied up outside, or kept away from the premises altogether. If such animals are kept in the house during the quarantine period they must be disinfected before they are allowed to run loose.

13. Representatives of the health department shall visit the premises from time to time as they see fit to observe the efficiency of quarantine, and for such purposes shall have the right of entry at any time.

14. Cases which can not or do not comply with the above requirements will be taken to the hospital.

15. It shall be the duty of the attending physician to instruct those dwelling in the same house as the patient of the provisions of the ordinance and of the meaning of quarantine.

16. The health department shall issue to each family in quarantine a circular setting forth in simple language the rules of quarantine and the rules to be observed in the care of these cases.

17. The period of quarantine will be reckoned from the date on which the case is reported to the health officer, or from the day on which the first symptoms appeared. Provided, that the attending physician certifies to this fact in writing to the health officer.

18. The minimum period of quarantine in cases of scarlet fever shall be 30 days with such additional time as may be necessary for the complete recovery of the case. No case under any circumstances shall be released until desquamation has absolutely and entirely ceased and until all nose and ear discharges have healed.

19. The minimum period of quarantine for cases of diphtheria shall be 14 days excepting where two successive negative cultures are made on two successive days, when the minimum period shall be seven days, provided that antitoxin has been used.

20. The minimum period of quarantine in cases of smallpox shall be 20 days with such additional time as is necessary for the complete recovery of the case. No patient shall be discharged until desquamation has entirely ceased.

21. The minimum period of quarantine for cases of epidemic cerebrospinal meningitis shall be 14 days with such additional time as is necessary for the complete recovery of the case.

B.—Isolation required in certain contagious diseases.

1. Patients affected with measles, mumps, whooping cough, chicken pox, or anterior poliomyelitis will be isolated at home, and those living in the same premises who are not affected with the disease will be permitted to leave the premises to attend to their regular duties, except when such individuals are associated with children away from the quarantined house. Provided further, that the health officer shall give notice to the public by placing a placard with the name of the disease in a conspicuous place on the building as in quarantine. If these regulations are not complied with to the satisfaction of the health officer, the patient and other occupants of the house shall be placed under strict quarantine, as described in section II A of these regulations.

2. The minimum period of isolation in cases of measles shall be 21 days, with such additional time as is necessary for the complete recovery of the case.

3. Cases of whooping cough shall be isolated until paroxysmal cough has entirely ceased.

4. Cases of mumps shall be isolated at least 21 days or until all swelling has subsided.

5. Cases of chicken pox shall be isolated at least 21 days or until the skin is clean and free from infection.

6. Cases of anterior poliomyelitis shall be isolated at least 14 days or until recovery is complete.

SECTION III.—Disinfection and fumigation.

A.—Health officer to terminate quarantine and isolation.

1. Upon receipt of notice from the attending physician of the complete recovery of any person affected with any of the aforesaid diseases, the health officer shall terminate the quarantine or isolation. Provided, that the minimum period of quarantine or isolation as set forth in section II has elapsed. He shall remove the placard and shall cause the premises to be fumigated and the patient and attendants to be disinfected in such manner as provided by the board of health.

2. The fumigation of premises shall be done only by an inspector of the board of health and under the supervision of the health department. The expense of fumigation shall be borne by the patient when the patient is able to pay, otherwise the expense shall be borne by the city. The maximum expense of fumigating shall be \$5, except in the case of public buildings when the expense shall be determined by the capacity to be fumigated. The health inspector shall make a monthly report to the board of health stating the number and location of the premises fumigated, and shall render an account of all money received from this source. The health inspector shall receive as compensation for his services 50 per cent of the receipts from fumigating and the balance shall be turned over by him to the board of health to provide the materials and to pay such other expenses as are incurred in doing this work.

SECTION IV.—Exclusion of children from school.

A.—Health officer to report cases of contagious disease to the superintendent of schools.

1. The health officer shall make a daily report to the superintendent of schools, giving the names and addresses of all contagious cases reported to him in the previous 24 hours.

2. When any child is taken from any school building ill with a contagious disease, the room from which the child was taken shall be fumigated within 12 hours.

B.—Children readmitted to school when.

1. Children affected with any of the following diseases will be given certificates by the health officer recommending admission to school as follows:

- Scarlet fever, 10 days after quarantine is terminated.
- Diphtheria, at the termination of quarantine.
- Smallpox, 15 days after quarantine is terminated.
- Epidemic cerebrospinal meningitis, when recovery is complete.
- Measles, at the termination of isolation.
- Chicken pox, at the termination of isolation.
- Whooping cough, 15 days after paroxysmal cough has ceased.
- Mumps, 10 days after all swelling has subsided.
- Anterior poliomyelitis, when recovery is complete.

C.—Contacts residing in the same dwelling place as the patient to be excluded from school.

1. No child or other person residing in the same premises as the patient shall be permitted to attend any public, private, Sunday, or sectarian school, and teachers of public and private schools are hereby required to exclude any and all such children from said schools until the expiration of the quarantine period or the isolation period for the last person in the premises so affected; provided, the person or persons so affected have been properly isolated during the quarantine period. Otherwise the exclusion for contacts shall continue for the following periods:

- Scarlet fever, 7 days.
- Diphtheria, 7 days.
- Smallpox, 14 days (unless vaccinated).
- Epidemic cerebrospinal meningitis, 14 days.
- Measles, 14 days.
- Chicken pox, 14 days.
- Whooping cough, 14 days.
- Mumps, 14 days.
- Anterior poliomyelitis, 14 days.

D.—Contacts residing in a dwelling place other than that of the patient to be excluded from school.

1. Any child residing in the same premises where an outbreak of any of the contagious diseases enumerated occurs, at the time of the outbreak may be allowed after taking a disinfecting bath and putting on disinfected clothing to remove therefrom and take up his or her residence in other premises occupied exclusively by adults, and, providing the disease has not been contracted at the end of the periods here specified, will be given a certificate by the health officer recommending readmission to school:

- Scarlet fever and diphtheria, each 7 days.
- Smallpox, epidemic cerebrospinal meningitis, measles, chicken pox, whooping cough, mumps, and anterior poliomyelitis, each 14 days.

SECTION V.—Transportation of cases.

Infected persons shall not move about or be moved about in the city or expose themselves in such manner as to endanger the general public. Cases shall be transported only by the conveyance of the health department except by special permission of the health officer. Patients transported to the city quarantine hospital in the city carriage may be accompanied by a nurse or other attendant if there be need of such an attendant, but such attendant shall, before leaving the city quarantine hospital, take a disinfecting bath and put on disinfected clothing and comply with such other rules as are directed by the board of health.

SECTION VI.—Precautions to be taken by those attending patients affected with contagious diseases.

1. Every person in attendance upon a case of contagious disease shall exercise due precaution to prevent the transmission of the disease.

2. Nurses who have been caring for a case of contagious disease shall, upon the termination of quarantine, take a disinfecting bath and shampoo, and shall put on disinfected clothing, and shall not enter upon the duties of another case for at least two days following such disinfection. During this time they are advised to keep in the open air as much of the time as possible.

SECTION VII.—*Health board to have power to act.*

The health officer and the board of health shall have the power to make such special regulations for the prevention and control of contagious diseases as they from time to time find necessary.

SECTION VIII.—*Previous regulations revoked.*

All previous regulations of the board of health for the management of contagious diseases are hereby revoked.

SECTION IX.

These regulations shall take effect on their passage.

SECTION X.—*Penalties.*

[Sec. 26, Revised Ordinances of the city of Fargo.]

Penalty for disobeying quarantine rules.

Any person whomsoever who shall violate any clause, provision, or requirement, duty or regulation of this chapter or of any rules or regulations of the said health officer, physician or person in charge of any quarantine, or who shall fail or neglect to comply with any such rules, provisions, requirements, duty or orders, or who shall interfere with or in any manner resist any officer or agent of the city in the discharge of his duty as herein contemplated or who shall commit any breach of the peace, or be guilty of any act, or thing calculated to defeat or interrupt the carrying into effect any part of this chapter or any regulation of the board of health, shall, on conviction, be liable to the penalty hereinafter provided.

Penalty for violation of ordinance.

[Sec. 94, Revised Ordinances of the city of Fargo.]

That any person who violates, disobeys, neglects or refuses to comply with, or who resists any of the provisions of this ordinance, or who refuses or neglects to obey any of the rules, orders or sanitary regulations of the board of health, or who omits, neglects, or refuses to comply with, or who resists the city scavenger or any of his assistants, or any officer or order, or special regulation of the board of health, scavenger or assistant scavenger, shall, upon arrest and conviction, be subject to a fine of not more than \$15, or imprisonment in the city jail not exceeding 10 days, or both, at the discretion of the court, for each and every offense.

[Regulation, Board of Health, adopted Nov. 6, 1911.]

FREEPORT, ILL.**COMMUNICABLE DISEASES—SCHOOL ATTENDANCE OF CASES AND CONTACTS, PLACARDS, DISINFECTION, FUNERALS AND BURIAL, QUARANTINE.**

SEC. 1. (a) That no child be allowed to attend school from any household in which there is or has been a case of scarlet fever, for a period of six weeks from the commencement of the last case in the household (except as provided in paragraph (d) of this section) and until a certificate has been presented from the health officer that all danger of conveying the disease by such child is passed.

(b) That no child who has visited a house in which there was at the time a case of scarlet fever, shall attend school until the expiration of two weeks following exposure, unless he has already had that disease.

(c) That no child who has diphtheria be allowed to attend school for a period of one week from the date of the second successive negative bacteriological culture from both nose and throat (except as provided under paragraph (d) of this section) and until a certificate has been presented from the attending physician to the health officer, that all danger of conveying the disease by such child is passed; and that no well child be allowed to attend school from any household in which there is, or has been, a case of diphtheria, until the same precautions have been taken, with the exception that but one negative bacteriological culture, from both nose and throat, is required.

(d) That the health officer or health committee may, if circumstances warrant, give to children or adults not infected in the household in which there is or has been

scarlet fever or diphtheria, a special permit to return to school or work as soon as said officer or committee considers it safe for them to do so.

(e) That no child from any house where there is a case of scarlet fever or diphtheria, shall be allowed to mingle with persons from any other house, until after the removal, recovery or death of the patient, and the disinfection of the premises.

(f) That every house infected with diphtheria, scarlet fever, smallpox, measles, typhoid fever, German measles, cerebrospinal meningitis or membranous croup, shall have affixed on or near the front and rear doors a card, furnished by the health officer stating the disease to be avoided; and any unauthorized person removing such card, shall be liable to a fine of not exceeding \$100.

SEC. 2. That no child who has chickenpox, or German measles, be allowed to attend school until a period of two weeks has elapsed from the first appearance of the eruption, and until a certificate to that effect is presented by the patient or attending physician.

SEC. 3. That no child found to be ill with consumption, and a menace to the health of others, be allowed to continue in school.

SEC. 4. That no child who has mumps be allowed to attend school until a period of two weeks has elapsed from the first signs or symptoms of the disease, and until a certificate to that effect from the patient or attending physician has been presented to the health officer.

SEC. 5. That no child who has measles be allowed to attend school until a period of two weeks has elapsed from the first appearance of the eruption and until a certificate to that effect from the parent or attending physician has been presented; and that no child in a household in which there is a case of measles shall be allowed to attend school within two weeks from the appearance of the rash in the last case in such household, without a certificate from the parent stating that such child has already had the disease.

SEC. 6. That no child with whooping cough be allowed to attend school until a period of eight weeks has elapsed from the beginning of the cough, and until a certificate to that effect from the parent has been presented; and that no child in a household in which there is a case of whooping cough shall be allowed to attend school within eight weeks from the beginning of the cough in the last case in such household without a certificate from the parent stating that such child has already had the disease.

SEC. 7. That no child be allowed to attend school from any household in which there is or has been a case of cerebrospinal meningitis, until a certificate has been presented from the health officer.

SEC. 8. That no child be allowed to attend school from any household where there is or has been a case of follicular tonsillitis for a period of two weeks from the time the first symptoms of the last case, or until a certificate has been presented by the parent or attending physician.

SEC. 9. That no child having infantile paralysis or having been exposed to said disease be permitted to attend school until a period of four weeks has elapsed from the first symptoms of the disease or from the time of such exposure, as the case may be.

SEC. 10. That no child who has membranous croup be allowed to attend school for a period of one week from the date of the second successive negative bacteriological culture from both nose and throat (except as provided under paragraph (d) of sec. 1 hereof), and until a certificate has been presented from the attending physician to the health officer that all danger of conveying the disease by such child has passed; and that no well child be allowed to attend school from any household in which there is, or has been, a case of membranous croup, until the same precautions have been taken, with the exception that but one negative bacteriological culture from both nose and throat is required.

SEC. 11. That no child be allowed to attend school from any household in which there has been a case of typhoid fever until two weeks after the termination of the last case in the household, except in a case where the patient has been removed to a hospital, and until a certificate has been presented from the committee on health or health officer that all danger of conveying the disease by such child is passed.

SEC. 12. That such rooms and such articles in any house as in the opinion of the health officer have been subjected to infection or contagion from smallpox, scarlet fever, diphtheria, cerebrospinal meningitis, or consumption shall be disinfected by such officer. The attending physician or the health officer shall decide in each case as to the proper time for disinfecting; but in no case of scarlet fever shall disinfection be done in less than four weeks from the commencement of the last case in the household (except by special permit of the health committee), and in diphtheria disinfection shall not be done until after at least two successive negative bacteriological cultures, both from the nose and throat, have been obtained; and in all cases a certificate of the attending physician shall be required, stating that all danger of infection from the patient has passed; said certificate in case of diphtheria to be based on the

result of the bacteriological examinations as above prescribed. Disinfection shall also be done in every case after a death from consumption, and after the removal of a consumptive patient, whenever in the opinion of the health officer or of the agent of the health committee disinfection is necessary.

SEC. 13. That no public funeral shall be held over the remains of any person who has died of smallpox, scarlet fever, or diphtheria, or cerebrospinal meningitis without the written permit of the health officer and under such regulations as may prevent the spread of either of said diseases. Ordered further, that the remains of any person who has died from either of said diseases shall at once be placed in a tight or sealed coffin, and shall not thereafter be exposed to view or disturbed except for burial.

SEC. 14. That the undertakers of the city be notified to warn families in the case of the death of a member from a contagious disease against a public funeral, and no undertaker shall conduct a funeral in violation of the terms thereof.

SEC. 15. That no person infected with diphtheria, membranous croup, or scarlet fever shall leave the house or home until the health committee or health officer shall find and certify that all danger of communicating such disease has passed.

SEC. 16. That in the case of death where the deceased had not been attended by a practicing physician, the certificate of death shall be issued by the health officer.

SEC. 17. That no dead body of any person shall be carried to any cemetery, or from one place to another, in or through the city, in any public vehicle other than a hearse or undertaker's wagon provided for that purpose.

SEC. 18. That the use of "wall draperies" in any room or place used for a funeral in case the death has been caused by contagious or infectious disease, or for the preparation or retention of any such human body before or in connection with such funeral, be, and the same is hereby, forbidden.

SEC. 19. Any person violating any of the provisions of this ordinance shall be subject to a fine of not less than \$5 nor more than \$100 for each offense.

SEC. 20. This ordinance shall be published in the Freeport Bulletin, and shall take effect and be in force 10 days after such publication.

[Ordinance adopted Feb. 5, 1912.]

CEREBROSPINAL MENINGITIS IN TEXAS.

Surg. Guiteras, at Galveston, Tex., reports that from January 19, the date of the occurrence of the first reported case of cerebrospinal meningitis at Galveston, to February 22, a total of 34 cases, with 9 deaths, was reported in that city.

At Houston, Tex., the health officer reports the occurrence of 15 cases of cerebrospinal meningitis, with 4 deaths, during the week ended February 3, and 18 cases, with 6 deaths, during the week ended February 10.

The disease is still present at other points in the State, but reports of the number of cases occurring have not been received.

PLAGUE-PREVENTION WORK.

DISTRIBUTION OF POISON.

In connection with the making and maintenance of a squirrel-free zone around the cities of California on San Francisco Bay, 1,427 acres of land in Alameda County were covered with poison during the week ended February 10, 1912.

During the same period 5,270 acres of land in San Joaquin County and 5,930 acres in Stanislaus County were covered with poison for the purpose of eradicating plague foci.

RECORD OF PLAGUE INFECTION.

Places.	Date of last case of human plague.	Date of last case of rat plague.	Date of last case of squirrel plague.	Total number of rodents found infected since May, 1907.
California:				
Cities—				
San Francisco.....	Jan. 30, 1908.....	Oct. 23, 1908.....	None.....	398 rats.
Oakland.....	Aug. 9, 1911.....	Dec. 1, 1908.....	do.....	126 rats.
Berkeley.....	Aug. 27, 1907.....	None.....	do.....	None.
Los Angeles.....	Aug. 11, 1908.....	do.....	Aug. 21, 1908.....	1 squirrel.
Counties—				
Alameda (exclusive of Oakland and Berkeley).	Sept. 26, 1909.....	Wood rat, Oct. 17, 1909.	Oct. 9, 1911.....	114 squirrels and 1 wood rat.
Contra Costa.....	July 21, 1911.....	None.....	Sept. 23, 1911.....	364 squirrels.
Fresno.....	None.....	do.....	Oct. 27, 1911.....	1 squirrel.
Merced.....	do.....	do.....	July 13, 1911.....	5 squirrels.
Monterey.....	do.....	do.....	Aug. 6, 1911.....	Do.
San Benito.....	June 5, 1910.....	do.....	June 8, 1911.....	22 squirrels.
San Joaquin.....	Sept. 18, 1911.....	do.....	Aug. 26, 1911.....	18 squirrels.
San Luis Obispo.....	None.....	do.....	Jan. 29, 1910.....	1 squirrel.
Santa Clara.....	Aug. 23, 1910.....	do.....	Oct. 5, 1910.....	23 squirrels.
Santa Cruz.....	None.....	do.....	May 17, 1910.....	3 squirrels.
Stanislaus.....	do.....	do.....	June 2, 1911.....	13 squirrels.
Washington:				
City—				
Seattle.....	Oct. 30, 1907.....	Sept. 21, 1911.....	None.....	25 rats.

RATS COLLECTED AND EXAMINED FOR PLAGUE INFECTION.

Places.	Week ended—	Found dead.	Total collected.	Examined.	Found infected.
California:					
Cities—					
Berkeley.....	Feb. 10, 1912	8	1 167	95	.....
Oakland.....	do.....	23	2 676	481	.....
San Francisco.....	do.....	5	1 601	1, 186	.....
Counties—					
San Joaquin.....	do.....		4 95	95	.....
Washington:					
City—					
Seattle.....	do.....		1, 000	1, 020	.....

¹ Identified: *Mus norvegicus*, 111; *Mus musculus*, 56.

² Identified: *Mus norvegicus*, 522; *Mus rattus*, 3; *Mus musculus*, 149; *Mus alexandrinus*, 2.

³ Identified: *Mus norvegicus*, 748; *Mus musculus*, 396; *Mus rattus*, 247; *Mus alexandrinus*, 210.

⁴ Identified: *Mus norvegicus*, 89; *Mus rattus*, 1; *Mus musculus*, 2; *Mus alexandrinus*, 3.

SMALLPOX IN THE UNITED STATES.

In the following table the States indicated by an asterisk are those from which reports of smallpox are received only from certain city, and in some cases county, boards of health. In these States, therefore, the recorded cases and deaths should not be taken as showing the general prevalence of the disease. In the States not marked by an asterisk the reports are received monthly from the State boards of health, and include all cases reported to the State authorities.

REPORTS RECEIVED DURING WEEK ENDED MAR. 1, 1912.

Places.	Date.	Cases.	Deaths.	Remarks.
Illinois:				
Counties.....	Jan. 1-May 31		4	
Adams.....	May 1-31.....	11		
Bond.....	do.....	9		
Boone.....	do.....	5		
Champaign.....	do.....	4		
Clinton.....	do.....	4		
Cook.....	do.....	26		
Crawford.....	do.....	1		
Dewitt.....	do.....	2		
Douglas.....	do.....	9		
Ford.....	do.....	6		
Hulton.....	do.....	7		
Hardin.....	do.....	7		
Kane.....	do.....	23		
Kankakee.....	do.....	1		
Lasalle.....	do.....	1		
Livingston.....	do.....	1		
McLean.....	do.....	14		
Macon.....	do.....	8		
Madison.....	do.....	1		
Massac.....	do.....	20		
Montgomery.....	do.....	18		
Morgan.....	do.....	10		
Pike.....	do.....	8		
Pulaski.....	do.....	1		
Randolph.....	do.....	7		
Saint Clair.....	do.....	8		
Saline.....	do.....	33		
Sangamon.....	do.....	4		
Stephenson.....	do.....	2		
Tazewell.....	do.....	20		
Union.....	do.....	1		
Vermilion.....	do.....	31		
White.....	do.....	20		
Will.....	do.....	9		
Winnebago.....	do.....	4		
Woodford.....	do.....	1		
Total for State.....		337	4	

SMALLPOX IN THE UNITED STATES—Continued.

Reports received during week ended Mar. 1, 1912.

Places.	Date.	Cases.	Deaths.	Remarks.
Illinois—Continued.				
Counties—Continued.				
Adams.....	June 1-30.....	2		
Bond.....	do.....	4		
Champaign.....	do.....	1		
Clinton.....	do.....	6		
Cook.....	do.....	3		
Hardin.....	do.....	12		
Kane.....	do.....	4		
McHenry.....	do.....	1		
McLean.....	do.....	10		
Macon.....	do.....	1		
Massac.....	do.....	6		
Pike.....	do.....	12		
Rock Island.....	do.....	2		
Saint Clair.....	do.....	3		
Saline.....	do.....	3		
Stephenson.....	do.....	1		
Vermilion.....	do.....	22		
Wayne.....	do.....	10		
Winnebago.....	do.....	3		
Total for State.....		106		
Adams.....	July 1-31.....	2		
Clay.....	do.....	1		
Gallatin.....	do.....	1		
Kane.....	do.....	1		
Lake.....	do.....	1		
McDonough.....	do.....	1		
McLean.....	do.....	1		
Macoupin.....	do.....	1		
Massac.....	do.....	1		
Owen.....	do.....	1		
Rock Island.....	do.....	1		
Saline.....	do.....	2		
Vermilion.....	do.....	2		
Whiteside.....	do.....	4		
Winnebago.....	do.....	5		
Schram City.....	do.....	1		
Total for State.....		26		
Coles.....	Aug. 1-31.....	9		
Effingham.....	do.....	3		
Kane.....	do.....	3		
Montgomery.....	do.....	1		
Ogle.....	do.....	2		
Vermilion.....	do.....	1		
Winnebago.....	do.....	11		
Total for State.....		30		
Bureau.....	Sept. 1-30.....	9		
Cook.....	do.....	2		
Fayette.....	do.....	13		
Henry.....	do.....	7		
Kane.....	do.....	13		
McHenry.....	do.....	1		
Peoria.....	do.....	1		
Rock Island.....	do.....	1		
Winnebago.....	do.....	7		
Funks Grove (city).....	do.....	1		
Total for State.....		55		
Bureau.....	Oct. 1-31.....	31		
Cook.....	do.....	1		
Kane.....	do.....	3		
Lasalle.....	do.....	6		
Lee.....	do.....	1		
McHenry.....	do.....	5		
Macon.....	do.....	4		
Ogle.....	do.....	16		
Peoria.....	do.....	7		
Sangamon.....	do.....	3		
Winnebago.....	do.....	2		
Total for State.....		79		
Bureau.....	Nov. 1-30.....	6		
Cumberland.....	do.....	1		
Dewitt.....	do.....	1		

SMALLPOX IN THE UNITED STATES—Continued.

Reports received during week ended Mar. 1, 1912.

Places.	Date.	Cases.	Deaths.	Remarks.
Illinois—Continued.				
Counties—Continued				
Jasper.....	Nov. 1-30.....	1	.....
Kane.....	do.....	1	.....
Kendall.....	do.....	1	.....
Knox.....	do.....	1	.....
Lasalle.....	do.....	7	.....
McHenry.....	do.....	4	.....
Madison.....	do.....	20	.....
Marion.....	do.....	1	.....
Ogle.....	do.....	2	.....
Pulaski.....	do.....	1	.....
St. Clair.....	do.....	1	.....
Sangamon.....	do.....	4	.....
Winnebago.....	do.....	2	.....
Total for State.....		54	.....
Bureau.....	Dec. 1-31.....	16	.....
Cook.....	do.....	3	.....
Dewitt.....	do.....	1	.....
Kane.....	do.....	1	.....
Knox.....	do.....	2	.....
Lasalle.....	do.....	11	.....
McHenry.....	do.....	3	.....
Madison.....	do.....	7	.....
Marion.....	do.....	4	.....
Ogle.....	do.....	1	.....
Sangamon.....	do.....	4	.....
Stephenson.....	do.....	3	.....
Whiteside.....	do.....	4	.....
Total for State.....		60	.....
Indiana:				
Counties—				
Adams.....	Jan. 1-31.....	3	.....
Bartholomew.....	do.....	33	.....
Cass.....	do.....	3	.....
Clinton.....	do.....	9	.....
Fountain.....	do.....	12	.....
Hancock.....	do.....	2	.....
Howard.....	do.....	5	.....
Madison.....	do.....	2	.....
Marion.....	do.....	1	.....
Monroe.....	do.....	1	.....
Randolph.....	do.....	7	.....
St. Joseph.....	do.....	1	.....
Vanderburg.....	do.....	8	.....
Wabash.....	do.....	1	.....
Wayne.....	do.....	1	.....
Total for State.....		89	.....
* Louisiana:				
New Orleans.....	Feb. 11-17.....	16	.....
Minnesota.....				
Nov. 1-30.....			1	Cases for November, p. 2026, Vol. I.
Counties—				
Becker.....	Jan. 2-8.....	1	.....
Brown.....	Jan. 9-15.....	1	.....
Chisago.....	Jan. 16-22.....	1	.....
Clay.....	Jan. 2-29.....	50	.....
Dodge.....	do.....	14	.....
Hennepin.....	do.....	33	.....
Lac qui Parle.....	do.....	7	.....
Nicollet.....	Jan. 16-22.....	1	.....
Ottertail.....	Jan. 9-20.....	15	.....
Pipestone.....	Jan. 16-22.....	1	.....
Ramsey.....	Jan. 9-29.....	91	.....
Rice.....	Jan. 9-22.....	8	.....
St. Louis.....	Jan. 16-22.....	23	.....
Scott.....	Jan. 23-29.....	2	.....
Steele.....	do.....	1	.....
Swift.....	Jan. 16-29.....	8	.....
Wabasha.....	Jan. 2-15.....	2	.....
Washington.....	Jan. 16-23.....	2	.....
Watsonwan.....	Jan. 9-15.....	20	.....
Winona.....	do.....	1	.....
Wright.....	Jan. 9-29.....	6	.....
Total for State.....		288	1	

SMALLPOX IN THE UNITED STATES—Continued.

Reports received during week ended Mar. 1, 1912.

Places.	Date.	Cases.	Deaths.	Remarks.
New York.....	Dec. 1-31.....	.....	2	
North Carolina:				
Counties—				
Anson.....	Nov. 1-30.....	21	.....
Cleveland.....	do.....	4	.....
Davidson.....	do.....	2	.....
Forsyth.....	do.....	1	.....
Granville.....	do.....	11	.....
Harnett.....	do.....	1	.....
Iredell.....	do.....	5	.....
Jones.....	do.....	1	.....
Macon.....	do.....	1	.....
Madison.....	do.....	14	.....
New Hanover.....	do.....	1	.....
Northampton.....	do.....	1	.....
Pender.....	do.....	3	.....
Robeson.....	do.....	1	.....
Rutherford.....	do.....	1	.....
Scotland.....	do.....	1	.....
Swain.....	do.....	1	.....
Transylvania.....	do.....	1	.....
Vance.....	do.....	8	.....
Total for State.....		79	.....
Alleghany.....	Dec. 1-31.....	1	.....
Anson.....	do.....	15	.....
Buncombe.....	do.....	2	.....
Cumberland.....	do.....	2	.....
Durham.....	do.....	2	.....
Granville.....	do.....	5	.....
Haywood.....	do.....	42	.....
Johnston.....	do.....	1	.....
Madison.....	do.....	5	.....
Martin.....	do.....	1	.....
Mecklenburg.....	do.....	3	.....
New Hanover.....	do.....	1	.....
Robeson.....	do.....	2	.....
Rowan.....	do.....	3	.....
Rutherford.....	do.....	2	.....
Swain.....	do.....	3	.....
Union.....	do.....	8	.....
Total for State.....		98	.....
*Tennessee:				
Knoxville.....	Feb. 4-17.....	7	.....
Utah:				
Counties—				
Boxelder.....	Jan. 1-31.....	4	.....
Cache.....	do.....	17	.....
Carbon.....	do.....	1	.....
Davis.....	do.....	20	.....
Juab.....	do.....	32	.....
Salt Lake.....	do.....	120	.....
San Pete.....	do.....	5	.....
Tooele.....	do.....	32	.....
Uintah.....	do.....	109	.....
Utah.....	do.....	23	.....
Wasatch.....	do.....	11	.....
Weber.....	do.....	25	.....
Total for State.....		390	.....
Grand total for the United States.....		1,714	7	

For reports received from July 1 to December 29, see Public Health Reports for December 29, 1911. The cumulative table of reported cases of smallpox, heretofore published each week, has been discontinued, and in its place summaries will be published periodically.

MORBIDITY AND MORTALITY.

MORBIDITY AND MORTALITY TABLE, CITIES OF THE UNITED STATES,
FOR WEEK ENDED FEB. 10, 1912.

Cities.	Popula- tion, United States census 1910.	Total deaths from all causes.	Diph- theria.		Measles.		Scarlet fever.		Small- pox.		Tuber- culosis.		Ty- phoid fever.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cities having over 500,000, inhabitants.														
Baltimore, Md.	558,485	202	22	5	6	21	2	34	22	6	3	12	3	3
Boston, Mass.	670,585	233	40	5	181	2	33	2	53	13	68	12	1	3
Chicago, Ill.	2,185,283	764	116	14	38	1	134	8	228	68	18	1	1	3
Cleveland, Ohio.	560,663	120	30	1	45	1	28	1	20	18	53	7	1	7
New York, N. Y.	4,766,883	1,511	333	27	868	14	332	16	444	181	60	20	1	3
Philadelphia, Pa.	1,549,008	547	52	15	27	4	25	2	81	60	20	3	1	3
Pittsburgh, Pa.	533,905	164	18	3	3	18	2	25	12	3	3	5	2	3
St. Louis, Mo.	687,029	259	27	5	16	1	23	1	44	5	5	2	2	3
Cities having from 300,000 to 500,000 inhabitants.														
Buffalo, N. Y.	423,715	144	17	3	4	11	1	16	10	5	1	1	1	1
Cincinnati, Ohio.	364,463	127	12	3	5	16	4	36	15	2	1	1	1	1
Detroit, Mich.	465,766	176	13	2	5	19	6	24	17	4	1	1	1	1
Los Angeles, Cal.	319,198	111	8	2	5	19	4	18	13	41	5	3	3	3
Milwaukee, Wis.	373,857	129	20	3	32	30	1	36	10	3	3	3	3	3
Newark, N. J.	347,469	121	15	1	1	20	4	26	21	1	1	1	1	1
New Orleans, La.	339,075	147	10	3	3	9	4	32	15	1	2	2	2	2
San Francisco, Cal.	416,912	147	4	1	274	1	6	28	11	9	9	9	9	9
Washington, D. C.	331,069	123	22	3	3	9	9	9	9	9	9	9	9	9
Cities having from 200,000 to 300,000 inhabitants.														
Jersey City, N. J.	267,779	94	1	1	1	1	1	9	3	1	1	1	1	1
Kansas City, Mo.	248,381	20	8	5	5	2	10	3	3	1	1	1	1	1
Providence	224,326	81	19	3	5	11	1	14	2	2	2	2	2	2
Cities having from 100,000 to 200,000 inhabitants.														
Bridgeport, Conn.	102,054	25	3	3	3	5	3	3	3	3	3	3	3	3
Cambridge, Mass.	104,839	31	6	6	6	13	8	6	6	6	6	6	6	6
Columbus, Ohio.	181,548	57	7	36	25	3	3	1	6	3	2	2	2	2
Dayton, Ohio.	116,577	49	4	2	2	3	3	4	3	1	1	1	1	1
Fall River, Mass.	119,295	38	3	2	4	4	3	4	4	4	4	4	4	4
Grand Rapids, Mich.	112,571	36	1	2	10	4	4	4	4	4	4	4	4	4
Lowell, Mass.	106,294	35	2	1	14	5	3	4	1	3	3	3	3	3
Nashville, Tenn.	110,364	33	3	1	3	3	3	16	3	3	3	3	3	3
Oakland, Cal.	150,174	37	2	2	1	3	3	1	4	1	1	1	1	1
Omaha, Nebr.	124,600	29	1	2	3	3	3	1	1	1	1	1	1	1
Spokane, Wash.	104,402	47	5	35	2	10	1	6	2	5	5	5	5	5
Toledo, Ohio.	168,497	47	4	2	23	9	6	7	7	7	7	7	7	7
Worcester, Mass.	145,986	57	10	1	15	15	6	6	6	6	6	6	6	6
Cities having from 50,000 to 100,000 inhabitants.														
Altoona, Pa.	52,127	23	3	1	1	1	2	2	2	2	2	2	2	2
Bayonne, N. J.	55,545	19	3	4	3	3	5	2	1	1	1	1	1	1
Brookton, Mass.	56,878	17	3	63	4	8	4	4	4	4	4	4	4	4
Camden, N. J.	94,538	24	3	3	8	11	1	2	3	3	3	3	3	3
Duluth, Minn.	78,466	26	8	4	11	1	1	5	3	1	1	1	1	1
Elizabeth, N. J.	73,409	28	3	1	1	1	1	3	1	1	1	1	1	1
Evansville, Ind.	69,647	11	1	2	1	1	1	5	3	1	1	1	1	1
Fort Wayne, Ind.	63,933	24	5	1	11	7	1	3	3	3	3	3	3	3
Harrisburg, Pa.	64,186	19	6	5	7	6	9	2	2	2	2	2	2	2
Hartford, Conn.	98,915	29	7	2	6	6	6	6	6	6	6	6	6	6
Hoboken, N. J.	70,324	41	1	2	5	5	1	8	1	1	1	1	1	1
Houston, Tex.	78,800	17	2	1	1	1	1	6	1	1	1	1	1	1
Johnstown, Pa.	55,482	25	3	1	1	1	1	6	4	4	4	4	4	4
Kansas City, Kans.	82,331	23	3	1	7	6	1	6	4	4	4	4	4	4
Lawrence, Mass.	85,892	23	3	1	7	6	1	6	4	4	4	4	4	4
Lynn, Mass.	89,336	23	3	1	7	6	1	6	4	4	4	4	4	4
Manchester, N. H.	70,063	23	9	1	28	3	1	2	3	3	3	3	3	3
New Bedford, Mass.	96,652	42	2	1	7	3	4	4	4	4	4	4	4	4
Passaic, N. J.	54,773	19	1	2	3	3	2	2	2	2	2	2	2	2
Pawtucket, R. I.	51,622	19	1	2	3	3	2	2	2	2	2	2	2	2

MORBIDITY AND MORTALITY—Continued.

Morbidity and mortality table, cities of the United States, for week ended Feb. 10, 1912—Continued.

Cities.	Popula- tion, United States census 1910.	Total deaths from all causes.	Diph- theria. Cases. Deaths.	Measles. Cases. Deaths.	Scarlet fever. Cases. Deaths.	Small- pox. Cases. Deaths.	Tuber- culosis. Cases. Deaths.	Ty- phoid fever. Cases. Deaths.
<i>Cities having from 50,000 to 100,000 inhabitants—Continued.</i>								
Reading, Pa.....	96,071	28	3	1	3		1	1
Saginaw, Mich.....	50,510		6	1	2		3	1
San Antonio, Tex....	96,614	37		27	3			
Schenectady, N. Y....	72,826	19		1	2		3	2
South Bend, Ind.....	53,684	13			1		3	2
Springfield, Ill.....	51,678	14	3		1	2	1	
Springfield, Mass....	88,926	22	3	35	5		1	
Trenton, N. J.....	96,815	42	1		1		1	1
Wichita, Kans.....	32,450		1		2		2	
Wilkes-Barre, Pa.....	67,105	27	2	58			6	
Wilmington, Del.....	87,411	30					1	
Yonkers, N. Y.....	79,803	17	6	3	6		3	
<i>Cities having from 25,000 to 50,000 inhabitants.</i>								
Atlantic City, N. J.....	46,150	9		1				
Auburn, N. Y.....	34,668	15	1		1		2	1
Aurora, Ill.....	29,807	6	1		1			
Berkeley, Cal.....	40,434	11		9			1	4
Binghamton, N. Y....	48,443	23	1		1	1	2	1
Brookline, Mass.....	27,792	6		2	2		1	
Chattanooga, Tenn....	44,604		2			1	1	1
Chicopee, Mass.....	25,401	5	1				1	
Danville, Ill.....	27,871	7	1				1	
East Orange, N. J.....	34,371	7	2	2	9			
Elmira, N. Y.....	37,176	15	2				2	1
Everett, Mass.....	33,484	11	1	2	4		2	1
Fitchburg, Mass.....	37,826	9	3		3		2	1
Haverhill, Mass.....	44,115	13	2	25	3		1	2
Kalamazoo, Mich.....	39,437	17		2	2		2	2
La Crosse, Wis.....	30,417	11	2	1			1	
Lancaster, Pa.....	47,227		2	1	1		2	
Lexington, Ky.....	35,099	19	2	19	1		1	1
Lynchburg, Va.....	29,494	11	1	7	4	1	1	
Malden, Mass.....	44,404	11		2	4		3	2
Montgomery, Ala.....	38,136	20		7		3	1	2
Newcastle, Pa.....	36,280		8	1	1		8	22
Newport, Ky.....	30,309	13			1	1	1	1
Newton, Mass.....	39,806	13	1	10	3			
Niagara Falls, N. Y..	30,445	11	2		2			2
Norristown, Pa.....	27,875	11						2
Orange, N. J.....	29,630	16	4	1	5		2	1
Pasadena, Cal.....	30,291	13						
Pittsfield, Mass.....	32,121	13	9	1	1		1	
Portsmouth, Va.....	33,190	14			1	1	2	
Racine, Wis.....	38,002	11	4					1
Roanoke, Va.....	34,874	10	1	47		3	5	
Rockford, Ill.....	45,401		2					16
Salem, Mass.....	43,697	25		1	1		1	
San Diego, Cal.....	39,578				1		4	4
South Omaha, Nebr....	26,259	7			1			
Superior, Wis.....	40,384	5	1			2		
Taunton, Mass.....	34,259	13	2		1		1	
Waltham, Mass.....	27,834	7	3	8			2	
West Hoboken, N. J....	35,403		1	3	3		2	
Wheeling, W. Va.....	41,641	18	2	1				2
Williamsport, Pa.....	31,860	9		1			4	2
Wilmington, N. C.....	25,748	14	2		1	5	1	
York, Pa.....	44,750		1	2	1			2
Zanesville, Ohio.....	28,026	15	2	1	1			38

MORBIDITY AND MORTALITY—Continued.

Morbidity and mortality table, cities of the United States, for week ended Feb. 10, 1912—Continued.

Cities.	Popula- tion, United States census 1910.	Total deaths from all causes.	Diph- theria.		Measles.		Scarlet fever.		Small- pox.		Tuber- culosis.		Ty- phoid fever.	
			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
<i>Cities having less than 25,000 inhabitants.</i>														
Ann Arbor, Mich.....	14,817	4					1							
Beaver Falls, Pa.....	12,191				2		1						4	
Braddock, Pa.....	19,957	7					1				3		1	
Butler, Pa.....	20,782	6	1											
Cambridge, Ohio.....	11,327	4					1							
Camden, S. C.....		2					1							
Carbondale, Pa.....	17,040	5					6							
Clinton, Mass.....	13,075	7									1			
Coffeyville, Kans.....	12,687										1		2	
Columbus, Ga.....	20,554	6												
Columbus, Ind.....		3										1		
Concord, N. H.....	21,497	9			2		1							
Cumberland, Md.....	21,839	8								2	2		2	
Dunkirk, N. Y.....			3										1	
Galesburg, Ill.....	22,089	7											1	
Gloucester, Mass.....	24,398	6										1		
Harrison, N. J.....	14,498	4	3											
Homestead, Pa.....		11	3	1										
Kearny, N. J.....	18,659	6					1							
La Fayette, Ind.....	20,081	3												
Lebanon, Pa.....	19,240		5	2									1	
Logansport, Ind.....	19,050	4	1		1									
Marionette, Wis.....	14,610	2			9								4	
Marlboro, Mass.....	14,579	5	1				1							
Massillon, Ohio.....		5												
Medford, Mass.....	23,150	8	1		2		1							
Melrose, Mass.....	15,715	2			9		2							
Moline, Ill.....	24,199	4	1		1						1		1	
Montclair, N. J.....	21,150	7	1		1		1				1			
Morristown, N. J.....	12,507	7									2		2	
Nanticoke, Pa.....	18,507	2	1	1	10									
Newburyport, Mass.....	19,240	8	1									1		
North Adams, Mass.....	22,012	8	1	1	3									
Northampton, Mass.....	19,431	7												
Ottumwa, Iowa.....	22,012	5												
Peekskill, N. Y.....		2												
Plainfield, N. J.....	22,250	8			13		2				1	1		
Pottstown, Pa.....		10			3									
Saratoga Springs, N. Y.....		5												
South Bethlehem, Pa.....	19,973	2	1		5									
Steelton, Pa.....	14,246	6	4					2			9	1		
Warren, Pa.....	11,081	2	1	1							1			
Wilkinsburg, Pa.....	18,924	5									1			
Woburn, Mass.....	15,508	7			1						1			

STATISTICAL REPORTS OF MORBIDITY AND MORTALITY, STATES OF THE UNITED STATES (Untabulated).

FLORIDA.—Week ended February 10, 1912. Diphtheria present in 3 localities with 4 cases, malaria in 3 localities with 7 cases, smallpox in 12 counties with 53 cases, tuberculosis in 4 localities with 4 cases, typhoid fever in 4 localities with 7 cases.

INDIANA.—Month of December, 1911. Population, 2,700,876. Total number of deaths from all causes 2,777, including diphtheria 48, measles 1, scarlet fever 11, tuberculosis 304, typhoid fever 50. Cases reported: Diphtheria 328 in 49 counties, scarlet fever 314 in 53 counties, typhoid fever 168 in 50 counties.

MINNESOTA.—Month of November, 1911. Population, 2,075,708. Total number of deaths from all causes 1,521, including diphtheria 19, scarlet fever 6, smallpox 1, tuberculosis 174, typhoid fever 51.

UTAH.—Month of January, 1912. Population, 373,351. Total number of deaths from all causes 297, including diphtheria 5, tuberculosis 11, typhoid fever 3. Cases reported: Diphtheria 41, measles 167, scarlet fever 183, smallpox 390, tuberculosis 7 (incomplete), typhoid fever 6.

FOREIGN AND INSULAR.

CHINA.

Hongkong—Plague—Examination of Rats.

Surg. Brown reports: During the week ended January 13, 3 cases of plague, with 2 deaths, were reported at Hongkong.

During the same period 1,633 rats were examined for plague infection. No plague-infected rat was found.

COLOMBIA.

Barranquilla—Communicable Diseases.

The report of the Charity Hospital in Barranquilla for the month of November, 1911, shows 523 ambulatory cases examined, of which 180 were malaria, 60 enteritis, 40 dysentery, 25 metrorrhagia, 18 tuberculosis, 50 hepatitis, 25 grippe, 14 gastritis, 30 anemia (probably caused by hookworm or malaria), 26 rheumatism. Of 100 cases in hospital at the end of the month, 50 were malaria from Aracataca, 10 malaria from a locality at the mouth of Atrato River, 10 malaria from Zaragoza. This statement gives an idea of the prevailing diseases among the poorer classes.

CUBA.

Transmissible Diseases.

The following statement of transmissible diseases in the island of Cuba was issued by the sanitary department:

MONTH OF JANUARY, 1912

	New cases.	Deaths.	Cases remaining under treatment.
Tuberculosis.....	131	180	1,712
Leprosy.....	5	3	350
Malaria.....	142	15	141
Typhoid fever.....	66	12	64
Diphtheria.....	85	12	19
Scarlet fever.....	18	1	6
Measles.....	80	4	32
Varicella.....	13	0	9
Tetanus in new-born.....	10	10	1
Filariasis.....	2	0	2
Dengue.....	1	0	1

HAWAII.

Plague at Honakaa—Infected Rats.

Chief Quarantine Officer Ramus reports, February 29, the occurrence of 2 deaths from plague at Honokaa February 25. Two plague-infected rats were found at Hilo and 1 at Honakaa.

ITALY.

Naples—Examination of Emigrants.

Surg. Geddings reports:

Vessels inspected at Naples and Palermo week ended February 3, 1912:

NAPLES.

Date.	Name of ship.	Destination.	Steerage passengers inspected and passed.	Pieces of baggage inspected and passed.	Pieces of baggage disinfected.
Feb. 2	Hamburg.....	New York.....	484	60	620
3	Adriatic.....	do.....	893	150	1,100
3	Caronia.....	do.....			
	Total.....		1,377	210	1,720

PALERMO.

Jan. 29	Luzon.....	New York.....			
29	Dora Baltea.....	do.....			
Feb. 3	Hamburg.....	do.....	62	40	100
	Total.....		62	40	100

JAVA.

Batavia Declared Free from Cholera.

The American consul reports that the district of Batavia was officially declared free from cholera December 31, 1911.

MEXICO.

Typhus Fever.

At Aguascalientes Consul Schmutz reports the occurrence of 4 deaths from typhus fever during the week ended February 11.

At Tampico Consul Miller reports 1 death from typhus fever during the 10 days ended January 20.

At Mexico City Consul General Shanklin reports the occurrence of 122 cases of typhus fever, with 9 deaths, during the two weeks ended January 13.

Puerto Mexico (Coatzacoalcas)—Yellow Fever.

Acting Asst. Surg. Thompson reports the occurrence of a death from yellow fever at Puerto Mexico (Coatzacoalcas) February 28.

PERU.

Status of Plague.

The following information was received from the director of public health of Peru:

OCTOBER 1-21, 1911.

Place.	Cases remaining Sept. 30.	New cases.	Re-covered.	Died.	Remaining Oct. 21.
Lima.....	10	13	4	6	13
Callao.....	2	1	1		2
Trujillo.....	2	8	1		9
Chiclayo.....	1	12		4	9
Lambayeque.....	1	3			4
Islay.....	2		2		
Chosica.....		1		1	

Callao—Plague.

Acting Asst. Surg. Castro-Gutierrez reports:

One case of plague occurred at Callao during the month of November, 1911, and 3 cases with 2 deaths from January 1 to 20, 1912.

RUSSIA.**Plague.**

According to information taken from the bulletin issued by the commission for the suppression of plague in Astrakhan, 3 cases of plague and 5 deaths were reported in the Kirghis Steppe, Astrakhan Government, from January 2 to 7. From October 4, 1911, the date of the beginning of the new outbreak, to January 7, 1912, a total of 201 cases with 180 deaths was reported.

VENEZUELA.**La Guaira—Yellow Fever.**

Information received February 27 shows the presence of yellow fever at La Guaira.

ZANZIBAR.**Zanzibar—Examination of Rats.**

Consul Weddell reports: During the three weeks ended January 7, 2,649 rats were examined for plague infection. No plague-infected rat was found.

CHOLERA, YELLOW FEVER, PLAGUE, AND SMALLPOX.**REPORTS RECEIVED DURING WEEK ENDED MAR. 1, 1912.**

[These tables include cases and deaths recorded in reports received by the Surgeon General, Public Health and Marine-Hospital Service, from American consuls through the Department of State and from other sources.]

CHOLERA.

Places.	Date.	Cases.	Deaths.	Remarks.
India:				
Madras.....	Jan. 14-20.....	18	14	
Indo-China:				
Saigon.....	Jan. 2-8.....	197	145	
Turkey in Asia:				
Aleppo.....	Jan. 28-Feb. 3.....	11	5	

YELLOW FEVER.

Mexico:				
Puerto Mexico (Coatzacoalcos).....	Feb. 28.....		1	7 cases in the lazaretto from s. s. Ikalis from Guayaquil.
Salina Cruz.....	Feb. 4-7.....			
Venezuela:				
Caracas.....	Jan. 1-15.....	8	8	
La Guaira.....	Feb. 27.....			Present.

PLAGUE.

China:				
Hongkong.....	Jan. 7-13.....	3	2	
Hawaii:				
Honakaa.....	Feb. 25.....	2	2	
India:				
Bombay.....	Jan. 14-20.....	6	4	
Karachi.....	do.....	1	1	
Mauritius.....	Dec. 1-7.....	7	6	

CHOLERA, YELLOW FEVER, PLAGUE, AND SMALLPOX—Continued.

Reports received during week ended Mar. 1, 1912.

PLAGUE—Continued.

Places.	Date.	Cases.	Deaths.	Remarks.
Peru:				
Departments—				
Callao.....	Oct. 1-21.....	1		In November 1 case, in January 3 cases with 2 deaths.
Chiclayo.....	do.....	12	4	
Chosika.....	do.....	1	1	
Lambayeque.....	do.....	3		
Libertad.....	do.....	8		
Lima.....	do.....	13	6	
Straits Settlements:				
Singapore.....	Jan. 1-6.....	2	2	

SMALLPOX.

Austria-Hungary:				
Bohemia.....	Jan. 14-20.....	1		
Krain.....	do.....	7		
Tyrol.....	do.....	1		
Brazil:				
Pernambuco.....	Dec. 15-31.....		77	
Canada:				
Montreal.....	Feb. 11-17.....	7		
Ottawa.....	Feb. 4-17.....	15		
Quebec.....	Feb. 10-17.....	16		
Toronto.....	Feb. 4-10.....	1		
Victoria.....	do.....	1		
Chile:				
Santiago.....	Nov. 1-30.....	1 685	343	Present.
Valparaiso.....	Jan. 14-20.....			
China:				
Hongkong.....	Jan. 6-13.....	27	19	
Shanghai.....	Jan. 15-21.....		1	
France:				
Paris.....	Jan. 21-27.....	5	2	
Germany.....	Jan. 28-Feb. 3.....	1		
Great Britain:				
London.....	do.....	2		
India:				
Bombay.....	Jan. 14-20.....	16	12	
Madras.....	do.....	8	6	
Italy:				
Leghorn.....	Feb. 4-10.....	4		
Messina.....	Jan. 1-31.....		1	
Turin.....	Jan. 29-Feb. 4.....	1		
Japan:				
Kobe.....	Jan. 22-28.....	1	1	Jan. 20, one case from s. s. Suverio from Hongkong.
Java:				
Batavia.....	Jan. 7-13.....	3	1	
Mexico:				
Aguascalientes.....	Feb. 5-11.....	1		
Chihuahua.....	Jan. 22-Feb. 11.....	30	15	
Magdalena.....	Feb. 7.....			62 cases present.
Mazatlan.....	Feb. 13.....			33 cases in the lazaretto.
Mexico.....	Jan. 1-13.....	12	7	
Tampico.....	Jan. 10-Feb. 10.....		4	
Portugal:				
Lisbon.....	Jan. 28-Feb. 3.....	2		
Siberia:				
Omsk.....	Jan. 1-31.....	7		
Spain:				
Madrid.....	do.....		2	
Valencia.....	do.....	24		
Straits Settlements:				
Singapore.....	Jan. 1-6.....	2		
Switzerland:				
Canton—				
Oberwalden.....	Jan. 14-20.....	1		
Teneriffe:				
Santa Cruz.....	Jan. 28-Feb. 3.....		4	
Turkey in Europe:				
Constantinople.....	Jan. 29-Feb. 4.....		8	
Venezuela:				
Caracas.....	Jan. 1-15.....		2	

¹ Bulletin Sanitary Information, Brussels, Jan. 13, 1912.

CHOLERA, YELLOW FEVER, PLAGUE, AND SMALLPOX—Continued.

REPORTS RECEIVED FROM DEC. 30, 1911, TO FEB. 23, 1912.

[For reports received from July 1, 1911, to Dec. 29, 1911, see PUBLIC HEALTH REPORTS for Dec. 29, 1911. In accordance with custom, the tables of epidemic diseases are terminated semiannually and new tables begun.]

CHOLERA.

Places.	Date.	Cases.	Deaths.	Remarks.
Arabia:				
Ras-el-Ketib.....	Dec. 27-Jan. 1.....			Total cases, 22; deaths, 12; mainly in the military hospital.
Austria-Hungary:				
Coastland—				
Capodistria.....	Dec. 14-24.....	2	2	
Croatia and Slavonia.				Total Oct. 22-Dec. 16: Cases, 36.
Sriem.....	Oct. 22-Dec. 16.....	36		
Hungary.....				Total Nov. 19-Dec. 23: Cases, 37.
Backs-Bodog.....	Dec. 10-16.....	9	5	
Jasz-Nagykun-Szolnok.	Dec. 3-23.....	11	7	
Torontal.....	Nov. 19-Dec. 16.....	17	2	
Bulgaria:				
Burgas.....	Nov. 22-23.....	2	2	
Varna.....	Nov. 6.....	1		
Dutch East Indies.....				Total Sept. 24-Nov. 27: Cases, 876; deaths, 529.
Batavia.....	Nov. 12-Dec. 23.....	21	8	Free Dec. 31.
India:				
Bahrein Island.....	Nov. 27-Dec. 30.....		260	In the Persian Gulf.
Calcutta.....	Nov. 5-Feb. 6.....		300	
Madras.....	Nov. 26-Jan. 13.....	400	330	Madras Presidency, Dec. 1-31: Cases, 3,870; deaths, 2,412.
Rangoon.....	Oct. 1-Nov. 30.....	6	3	
Indo-China:				
Saigon.....	Nov. 20-Jan. 1.....	861	628	
Italy.....				Total June 8-Dec. 31: Cases: 15,985; deaths, 6,022.
Provinces—				
Caltanissetta.....	Nov. 26-Dec. 31.....	9	7	
Girgenti.....	do.....	105	57	
Messina.....	Nov. 26-Dec. 2.....	3	2	
Syracuse.....	Nov. 26-Dec. 23.....	15	9	
Malta.....	Nov. 19-Dec. 10.....	6	6	Dec. 23 declared free from cholera.
Montenegro.....	Nov. 4-11.....	9	5	
Persia:				
Adaban.....	Nov. 4.....	1	1	
Philippine Islands:				
Province—				
Union.....	Oct. 29-Dec. 4.....	5	5	
Roumania.....				Total Sept. 9-Dec. 13: Cases, 192; deaths, 42, including cases previously reported.
Districts—				
Braila.....	Sept. 11-Dec. 13.....	84	11	Including cases previously reported.
Convuluri.....	Oct. 31-Nov. 28.....	21	1	
Dolijiu.....	Nov. 6-Dec. 13.....	19	4	
Jalonitza.....	Oct. 31-Nov. 28.....	4		
Konstanza.....	Oct. 30-Nov. 28.....	8		
Prahova.....	Nov. 6-23.....	1	1	
Talomita.....	do.....	2		
Tulcea.....	Nov. 24-Dec. 13.....	15	1	
Servia:				
Belgrade, district.....	Nov. 26-Dec. 16.....		1	Declared free Dec. 31.
Siam:				
Bangkok.....	Nov. 5-Dec. 30.....		559	
Straits Settlements				
Singapore.....	Nov. 5-18.....	3	3	
Tripoli:				
Tripoli.....	Oct. 25-Nov. 10.....			150 to 200 among the civil population and 25 to 30 among the military, Dec. 21, 1911.
Tunis Regency.....				Total Nov. 25-Jan. 4: Cases, 358; deaths, 396.
Beja district.....	Nov. 25-Dec. 7.....	30	35	
Bizerta district.....	Nov. 25-Dec. 5.....	9	15	
Turkey in Asia:				
Adana.....	Dec. 2-6.....	16	5	
Aleppo.....	Jan. 26-27.....	5	3	
Amara.....	Oct. 15.....	1	1	
Basra.....	Oct. 22-28.....	14	10	
Erzeroum, vilayet.....	Sept. 11-16.....	50	28	
Erzeroum.....	do.....	11	8	
Kaifa.....	Dec. 8.....			Present.

CHOLERA, YELLOW FEVER, PLAGUE, AND SMALLPOX—Continued.

Reports received from Dec. 30, 1911, to Feb. 23, 1912—Continued.

CHOLERA—Continued.

Places.	Date.	Cases.	Deaths.	Remarks.
Turkey in Asia—Continued.				
Kerbelah.....	Oct. 20-28.....	10	10	
Kharput.....	Nov. 19-Dec. 30....	47	47	
Jiddah.....	Dec. 2-24.....	323	310	
Mekka.....	Dec. 4-24.....	905	879	Sept. 1-Dec. 24: Cases, 1,648; deaths, 1,565.
Mersina.....	Dec. 1-7.....	2	1	
Osmania.....	Dec. 1-6.....	2	4	
Sinope.....	Dec. 7.....	2	1	
Trebizond and vicinity.....	Sept. 18-23.....	64	34	
Tripoli.....	Jan. 4.....			Present.
Turkey in Europe:				
Constantinople.....	Oct. 24-Jan. 21....	6	2	
Durazzo.....	Dec. 7-13.....	2		
Janina.....	Jan. 22.....	17	8	
Loros.....	do.....	12	7	
Saloniki, vilayet.....	Nov. 6-19.....	4	3	In Serres.

YELLOW FEVER.

Brazil:				
Manaos.....	Nov. 19-Jan. 6.....		8	
Para.....	Dec. 9-16.....	1	1	
Ecuador:				
Bucay.....	Nov. 16-30.....	2		
Duran.....	Dec. 1-15.....	3	2	
Guayaquil.....	Nov. 16-Dec. 15....	20	11	
Milagro.....	do.....	8	1	
Mexico:				
Espita.....	Dec. 31-Jan. 6.....	1		
Maxcanu.....	do.....	1		
Merida.....	Nov. 12-Feb. 3.....	15	9	Total Aug. 1-Feb. 3: Cases, 60; deaths, 29.
Temax.....	Dec. 31-Jan. 6.....	1		
Portuguese Guinea:				
Bolama.....	Dec. 19-25.....	1	1	In an engineer on a vessel.
Venezuela:				
Caracas.....	Nov. 16-Dec. 31....	17		
Sabana Grande.....	Dec. 12.....			Epidemic.
West Indies:				
St. Vincent.....	Feb. 19.....	1		
At sea.....	Dec. 17-23.....	1	1	On a vessel en route from Manaos to Para.

PLAGUE.

Algeria:				
Philippeville.....	Oct. 19-Nov. 11....	8	2	Including 5 cases, p. 2096, Vol. XXVI.
Brazil:				
Bahia.....	Sept. 1-30.....		2	
Para.....	Dec. 24-Jan. 27....	18	10	
Pernambuco.....	Oct. 16-Jan. 16....		4	
Rio de Janeiro.....	Nov. 12-Dec. 23....	6	3	
British East Africa:				
Kismayu.....	Oct. 15-25.....	2		1 case pneumonic.
British South Africa:				
Durban.....	Jan. 17.....	2	1	
Chile:				
Iquique.....	Nov. 12-Jan. 6.....	10	4	
Pisagua.....	Nov. 1-30.....	8		
China:				
Amoy.....	Jan. 13.....		1	
Hongkong.....	Dec. 9-30.....	4	3	
Dutch East Indies:				
Java.....				Total Mar. 1-Dec. 9: Cases, 1,777; deaths, 1,262.
Paserocean Residency, Malang District.....	Nov. 12-Jan. 13....	66	32	
Soerabaya.....	Oct. 17-27.....	2		
German East Africa:				
Dar-es-Salaam.....	Nov. 13-15.....	1	1	From the interior via Bergamogo.
Ecuador:				
Guayaquil.....	Nov. 16-Dec. 15....	102	42	

CHOLERA, YELLOW FEVER, PLAGUE, AND SMALLPOX—Continued.

Reports received from Dec. 30, 1911, to Feb. 23, 1912—Continued.

PLAGUE—Continued.

Places.	Date.	Cases.	Deaths.	Remarks.
Egypt				Total Jan. 1-Dec. 31, 1911: Cases, 1,656; deaths, 1,041, including cases previously reported.
Provinces—				
Assiout.....	Jan. 1-25.....	12	9	Sept. 11-16: Cases, 50; deaths, 28.
Assouan.....	Jan. 1-Feb. 25.....	1	1	
Behera.....	Jan. 1-25.....	3	2	Sept. 11-16: Cases, 11; deaths, 8.
Fayoum.....	Jan. 1-26.....	1		
Galioubeh.....				Oct. 5-Dec. 26: Cases, 1
Garbieh.....	Jan. 1-25.....	1		
Kena.....	do.....	1	1	Nov. 20-Dec. 13: Cases, 3; deaths, 3.
Minieh.....	do.....	3	2	Dec. 13: Cases, 1.
Hawaii:				
Honakaa.....	Feb. 9.....	1	1	
India:				
Bombay.....	Nov. 19-Jan. 13.....	74	66	
Calcutta.....	Nov. 11-Feb. 6.....		46	
Karachi.....	Nov. 26-Jan. 13.....	38	36	Total, year 1911: Cases, 3,273; deaths, 3,046.
Rangoon.....	Oct. 1-Nov. 30.....	38	39	
Bombay Presidency and Sind.....	Oct. 29-Dec. 30.....	35,557	25,895	
Madras.....	Jan. 1-6.....	1	1	
Madras Presidency.....	Oct. 29-Dec. 30.....	4,687	3,770	
Bengal.....	do.....	3,893	2,827	
United Provinces.....	do.....	12,270	10,459	
Punjab.....	do.....	1,229	895	
Burma.....	do.....	206	187	
Central Provinces.....	do.....	6,883	5,234	
Coorg.....	do.....	75	42	
Mysore State.....	do.....	4,913	3,801	
Hyderabad State.....	do.....	10,830	10,038	
Central India.....	do.....	4,242	3,486	
Rajputana and Ajmere.....	do.....	457	362	
Merwara.....				
North West Province.....	Oct. 29-Dec. 9.....	1	1	Total for India, Oct. 29-Dec. 30: Cases, 85,243; deaths, 66,997. Total, year 1911: Cases, 828,535; deaths, 691,849.
Indo-China:				
Saigon.....	Nov. 13-Jan. 1.....	21		
Java:				
Kediri.....	Nov. 26-Dec. 2.....	1	1	
Madison.....	do.....	5	5	
Mauritius.....	Nov. 3-30.....	29	20	
Peru:				
Salaverry.....	Dec. 25-Jan. 9.....			Present in vicinity.
Philippine Islands:				
Cebu quarantine station.....	Dec. 4.....	1		On s. s. Montrose from Shanghai.
Russian Empire:				
Astrakhan, government.....	Sept. 21-Jan. 7.....	201	180	Including 73 cases and 63 deaths reported on page 2008, Vol. I.
Siam:				
Bangkok.....	Nov. 4-Dec. 2.....		2	
Straits Settlements:				
Singapore.....	Nov. 5-Dec. 30.....	15	14	
Turkey in Asia:				
Jiddah.....	Jan. 13-15.....	2		

SMALLPOX.

Algeria:				
Algiers.....	Nov. 1-30.....		1	
Arabia:				
Aden.....	Nov. 28-Jan. 15.....	5	3	And vicinity.
Argentina:				
Buenos Aires.....	Oct. 1-31.....		6	
Rosario.....	Oct. 1-Nov. 30.....		31	
Austria-Hungary:				
Galicia.....	Dec. 24-30.....	1		
Trieste.....	Dec. 3-9.....	1		From s. s. Baron Call from Beirut.
Brazil:				
Bahia.....	July 1-31.....		1	
Pernambuco.....	Oct. 16-Nov. 30.....		246	Report for Oct. 1-15 not received.
Rio de Janeiro.....	Nov. 26-Jan. 6.....	3	1	

CHOLERA, YELLOW FEVER, PLAGUE, AND SMALLPOX—Continued.

Reports received from Dec. 30, 1911, to Feb. 23, 1912—Continued.

SMALLPOX—Continued.

Places.	Date.	Cases.	Deaths.	Remarks.
Canada:				
British Columbia—				
Nelson.....	Dec. 24-30.....	1		
Manitoba—				
Winnipeg.....	Jan. 14-20.....	1		
Ontario—				
Kingston.....	Dec. 19-23.....	1		
Ottawa.....	Dec. 10-Jan. 27.....	45		
Sarnia.....	Oct. 17-Dec. 31.....	42		
Toronto.....	Jan. 6-13.....		1	
Windsor.....	Feb. 4-10.....	2		
Quebec—				
Montreal.....	Dec. 17-Feb. 10.....	13		
Quebec.....	Dec. 10-Feb. 10.....	208	1	
Ceylon:				
Colombo.....	Nov. 12-18.....	1		
Chile:				
Iquique.....	Dec. 10-16.....	2		
La Serena.....	Nov. 21-30.....	14		
Talcahuano.....	Nov. 26-Dec. 23.....	14	3	
Valparaiso.....	Dec. 3-9.....	43		
China:				
Canton.....	Nov. 11-Dec. 30.....	40	6	Present.
Chungking.....	Nov. 18-Dec. 9.....			
Hongkong.....	Nov. 12-Jan. 6.....	100	78	
Nanking.....	Dec. 10-Jan. 27.....			Do.
Shanghai.....	Dec. 11-Jan. 7.....		2	
Cuba:				
Habana.....	Dec. 19-Jan. 19.....	2		Case Dec. 19 from German s. s. Frankenwald from Spain and Canary Islands, case Jan. 19 from s. s. Mexico.
Egypt:				
Cairo.....	Dec. 10-Jan. 14.....	3		
France:				
Marseilles.....	Nov. 1-30.....		1	
Paris.....	Dec. 3-Jan. 20.....	51	3	
Germany:				Total, Dec. 31-Jan. 27: Cases, 9.
Hamburg.....	Jan. 21-27.....	1		
Great Britain:				
Bristol.....	Jan. 29-Feb. 3.....	2		
London.....	Feb. 14-20.....		1	
India:				
Bombay.....	Nov. 19-Jan. 13.....	71	39	
Calcutta.....	Nov. 19-Feb. 6.....		17	
Madras.....	Nov. 26-Jan. 13.....	40	23	
Rangoon.....	Oct. 1-Nov. 30.....	29	9	
Indo-China:				
Saigon.....	Nov. 13-Jan. 1.....	23		
Italy:				
Genoa.....	Dec. 1-Jan. 31.....	33	2	
Leghorn.....	Dec. 16-Feb. 3.....	79	1	
Messina.....	Nov. 19-Dec. 31.....		5	
Naples.....	Dec. 3-Jan. 27.....	50		
Palermo.....	Nov. 26-Jan. 27.....	1,946	655	
Turin.....	Jan. 15-21.....	2		
Japan:				
Arima-Mura.....	Nov. 12-18.....	6	1	11 miles east from Kobe.
Kanagawa, ken.....	Dec. 17-23.....	1		
Java:				
Batavia.....	Nov. 12-Jan. 6.....	19	4	
Malta:				
Malta.....	Dec. 24-Jan. 6.....	2	1	
Mexico:				
Aguascalientes.....	Dec. 18-Feb. 3.....		4	
Chihuahua.....	Nov. 20-Jan. 21.....	62	21	
Coahuila, State.....	Oct. 1-30.....		16	
Gundalajara.....	Jan. 14-Feb. 10.....		2	
Juarez.....	Dec. 19-Feb. 10.....	9	4	
Magdalena.....	Dec. 23-Feb. 7.....		47	Feb. 7, 62 cases present.
Mazatlan.....	Dec. 11-Jan. 30.....		9	
Mexico.....	Nov. 26-Dec. 30.....	34	18	
Monterey.....	Dec. 11-24.....		2	
Porfirio Diaz.....	Dec. 3-Feb. 3.....		30	
San Antonio.....	Jan. 1-21.....	12	9	
San Carlos.....	do.....			Present.
Sandoval.....	Dec. 16.....			Do.
San Ignacio.....	Jan. 8.....	3		
Sarie.....	Jan. 21-27.....		6	
Santa Ana.....	Jan. 8.....	4		

CHOLERA, YELLOW FEVER, PLAGUE, AND SMALLPOX—Continued.

Reports received from Dec. 30, 1911, to Feb. 23, 1912—Continued.

SMALLPOX—Continued.

Places.	Date.	Cases.	Deaths.	Remarks.
Mexico—Continued.				
San Luis Potosi.....	Nov. 12-Dec. 2....	3		
Tampico.....	Dec. 1-31.....	4	4	
Tapachula.....	Nov. 1-Dec. 31....		14	
Portugal:				
Lisbon.....	Dec. 9-Jan. 27....	21		
Russia:				
Batum.....	Dec. 1-31.....	1		
Libau.....	Dec. 17-23.....	1		
Moscow.....	Nov. 19-Jan. 20....	22	8	
Odessa.....	Nov. 26-Jan. 13....	10	1	
Reval.....	Nov. 1-30.....	1		
Riga.....	Dec. 24-Jan. 27....	16		
St. Petersburg.....	Nov. 19-Jan. 27....	95	14	Oct. 1-Nov. 30; deaths, 2.
Warsaw.....	Nov. 5-Dec. 2.....		185	
Siam:				
Bangkok.....	Nov. 5-Dec. 30....		626	
Spain:				
Cadiz.....	Nov. 1-Dec. 31....		14	
Madrid.....	Dec. 1-31.....		1	
Malaga.....	Nov. 1-30.....		45	
Seville.....	Dec. 1-31.....		5	
Valencia.....	Dec. 3-Jan. 27....	107	10	
Straits Settlements:				
Singapore.....	Nov. 19-Dec. 30....	12	4	
Switzerland:				
Zurich, Canton.....	Dec. 3-23.....	6		
Teneriffe:				
Santa Cruz.....	Dec. 3-Jan. 27....		31	
Turkey in Asia:				
Beirut.....	do.....	285	47	
Turkey in Europe:				
Constantinople.....	Dec. 4-Jan. 28....		45	
Uruguay:				
Montevideo.....	Sept. 1-Nov. 30....	23	4	
Venezuela:				
Caracas.....	Nov. 1-Dec. 31....	11		
Zanzibar:				
Zanzibar.....	Oct. 28-Dec. 15....	3	2	

MORTALITY.

WEEKLY MORTALITY TABLE, FOREIGN AND INSULAR CITIES.

Cities.	Week ended—	Estimated population.	Total deaths from all causes.	Deaths from—									
				Tuberculosis.	Plague.	Cholera.	Yellow fever.	Smallpox.	Typhus fever.	Typhoid fever.	Scarlet fever.	Diphtheria.	Measles.
Aberdeen.....	Feb. 3	163,084	57										1
Aguascalientes.....	Feb. 11	40,000	53					1	4			1	
Aleppo.....	Jan. 27	200,000				3							
Do.....	Feb. 3					5							
Amoy.....	Jan. 13	200,000			1					1			
Do.....	Jan. 20									1			
Amsterdam.....	Feb. 8	580,962	153	24								1	2
Antwerp.....	Jan. 27	309,839	86	7									2
Barmen.....	do.....			5								1	
Batavia.....	Jan. 6	217,630							1				
Do.....	Jan. 13							1					
Beirut.....	Jan. 27	80,000	25	2				15	10				
Belfast.....	Feb. 3	385,492	233	28							1	1	14
Berlin.....	Jan. 20	2,085,626	564	67						10	17	6	6
Do.....	Jan. 27		615	72						5	17	1	9
Belgrade.....	do.....	90,050	28							2			

MORTALITY—Continued.

Weekly mortality table, foreign and insular cities—Continued.

Cities.	Week ended—	Estimated population.	Total deaths from all causes.	Deaths from—										
				Tuberculosis.	Plague.	Cholera.	Yellow fever.	Smallpox.	Typhus fever.	Typhoid fever.	Scarlet fever.	Diphtheria.	Measles.	Whooping cough.
Birmingham.....	Feb. 3	842,512	312									1		26
Bombay.....	Jan. 20	977,822	713	38	4			12					8	
Bordeaux.....	Feb. 3	253,000	116	12									2	
Bradford.....	Jan. 20	289,618	70	2						1				
Do.....	Jan. 27		90	11								1	1	1
Do.....	Feb. 3		84	6								1	1	1
Bristol.....	...do....	359,400	150	11						1	1	1	1	
Brunswick.....	Jan. 20-27	145,000		1									2	1
Brussels.....	Jan. 27	649,846	238	21						2	4	11		
Cairo.....	Jan. 14	689,439	493	26					6	1	1		10	
Catcutta.....	Jan. 13	890,493	529	30	12	28						11		
Catania.....	Feb. 2	207,000	70	1								3	1	
Chihuahua.....	Jan. 28	39,000	32	4				1						
Do.....	Feb. 4		21	7				4						
Do.....	Feb. 11		22	1										
Christiana.....	Jan. 27	245,000	81	7				3						
Do.....	Feb. 3		57	11										
Constantinople.....	Jan. 28	1,000,000	306	38				6		1	5	1	3	2
Do.....	Feb. 4		323	36				8		5	2	3	4	
Cologne.....	Jan. 27	525,671	171	22						5		1	4	3
Copenhagen.....	Jan. 20	465,000	118	7								1		2
Dalny.....	Jan. 29	47,695	27								1			
Dresden.....	Jan. 20	555,000	143	25								2		
Dundee.....	Feb. 3	171,006	65	7						5				1
Georgetown.....	Jan. 20	57,577	56	5						1				
Do.....	Jan. 27		51	5										
Edinburgh.....	Feb. 3	321,200	92	6								3	3	1
Frankfort-on-Main.....	Jan. 20	423,600	93									3		1
Ghent.....	Jan. 27	166,235	61	2										
Glasgow.....	Feb. 9	785,600	340								2	4	43	3
Gothenburg.....	Jan. 27	170,100	35	9						1		2		1
Greenock.....	Feb. 3	75,900	31											1
Hamburg.....	Jan. 27	953,079	322	38					1	3	11	2		3
Havre.....	Feb. 3	136,159	79	8					1	1			2	
Hongkong.....	Jan. 6	336,488						22				1		
Hull.....	Feb. 3	282,987	102						1			1		
Karachi.....	Jan. 20	149,000	88		1									
Kharput.....	Jan. 26	21,000							1					
Kingston, Ont.....	Feb. 10	21,000	5						1					
Do.....	Feb. 11		8						1					
Kobe.....	Jan. 21	418,646	171								4			
Do.....	Jan. 28		152					1			1	3		
Leeds.....	Feb. 3	445,568	172	19							1	3		
Liege.....	Jan. 27	167,521	63	4							3		2	
Liverpool.....	Feb. 3	752,055	309	34							2	3	2	5
London.....	...do....	7,340,125	2,289							4		23	9	40
Lubeck.....	Jan. 27	100,000	34	4								1		
Madras.....	Jan. 20	518,660	530			14		6		1			1	
Magdeburg.....	Jan. 13	285,671	98	6							2	5		
Manchester.....	Feb. 3	631,533	343	32					4			2	13	13
Mannheim.....	Jan. 20	200,000	51	4									1	
Maracaibo.....	Feb. 9	50,000	12	4										
Mexico.....	Jan. 6	719,052	441	24						1				
Do.....	Jan. 13		416	19				4	11		4		1	9
Montreal.....	Feb. 10	466,197	150	22						2		2		5
Do.....	Feb. 17		206	26						2	3	1		6
Moscow.....	Jan. 20	1,500,000	774	111				1		5	15	14	37	9
Nagoya.....	Jan. 13	419,434	159											
Newcastle-on-Tyne.....	Feb. 3	269,193	98	13							2	1	1	1
Nottingham.....	Jan. 24	260,000	88	8									1	
Ottawa.....	Feb. 10	90,000	39	5								2		
Ottawa.....	Feb. 17	90,000	27	1								5		
Palermo.....	Jan. 27	340,000	205	11				60		1	5			
Para.....	...do....	185,000	76	4	6									
Paris.....	...do....	2,888,110	1,049	221					2		10	4	6	15
Patras.....	Feb. 4	40,000	12							1				1
Plymouth.....	Feb. 3	124,180	44							1			1	
Port Elizabeth.....	Jan. 6	30,692	11	3										2
Do.....	Jan. 13		9	2							1			
Port Said.....	Jan. 14	52,811	25	2								1		

MORTALITY—Continued.

Weekly mortality table, foreign and insular cities—Continued.

Cities.	Week ended—	Estimated population.	Total deaths from all causes.	Deaths from—								
				Tuberculosis.	Plague.	Cholera.	Yellow fever.	Smallpox.	Typhus fever.	Typhoid fever.	Scarlet fever.	Diphtheria.
Quebec.....	Feb. 17	78,200										1
Rangoon.....	Jan. 13	289,432	180		5	5		2				
Roubaix.....	Jan. 31	122,723	140	24								1
Rotterdam.....	Feb. 3	436,015	103									2
Saigon.....	Jan. 8	220,000				145						
Salina Cruz.....	Feb. 10	6,138							1			
St. Petersburg.....	Jan. 13	1,907,708	795	136				2	10	17	10	37
Salina Cruz.....	Feb. 3	6,138	8	1								
Santa Cruz de Tenerife.....	Jan. 27	46,000	23	1				2	1			
Santiago de Cuba.....	Feb. 3	53,614	15									1
Shanghai.....	Jan. 15											
Sheffield.....	Jan. 28	500,000	328	37				1		6	6	26
Singapore.....	Feb. 3	455,000	150	12						1	2	
Stockholm.....	Jan. 6	303,328	219	28	2							6
Talcahuana.....	Jan. 20	343,832	81	14								2
Do.....	Jan. 13	28,000		2								1
Do.....	Jan. 24			3								2
Tampico.....	Jan. 15											
Tientsin.....	Feb. 10	23,452	123					4	1			
Toronto.....	Jan. 20	425,000	41	9							1	
Do.....	Feb. 3	392,000	133	14					1	1	2	
Do.....	Feb. 10		120	4						2	4	
Do.....	Feb. 17		124	5						3	2	
Trieste.....	Jan. 20	233,925	104									2
Turin.....	Feb. 4	401,555	157	19					1			6
Valencia.....	Feb. 3	240,000	112	11							1	1
Victoria.....	Feb. 10	31,620	12	1								
Vienna.....	Jan. 20	2,064,583	677	108						1	5	7
Vigo.....	Jan. 27	41,500	14	3					1			
Do.....	do.		15	2							2	
Windsor.....	Feb. 17	17,819	3						1			
Winnipeg.....	Feb. 3	151,958	38	1								1
Do.....	Feb. 10		44	1					1			3
Yokohama.....	Jan. 29	419,630							1		1	

MORTALITY—FOREIGN AND INSULAR—COUNTRIES AND CITIES (Untabulated).

BRAZIL—Pernambuco.—Two weeks ended December 31, 1911. Population, 225,000. Total number of deaths from all causes 409, including smallpox 77, tuberculosis 79, typhoid fever 1.

CANADA—Hamilton.—Month of January, 1912. Population, 82,000. Total number of deaths from all causes 116, including diphtheria 1, measles 1, tuberculosis 4, typhoid fever 1.

Vancouver.—Month of December, 1911. Population, 100,000. Total number of deaths from all causes 98, including diphtheria 2, measles 1, tuberculosis 10, typhoid fever 2.

FRANCE—Calais.—Month of January, 1912. Population, 75,000. Total number of deaths from all causes 109, including diphtheria 1, measles 2, tuberculosis 32.

Nice.—Month of August, 1911. Population, 168,185. Total number of deaths from all causes 237, including tuberculosis 34, typhoid fever 20.

Month of September, 1911. Total number of deaths from all causes 219, including tuberculosis 27, typhoid fever 12.

Month of October, 1911. Total number of deaths from all causes 181, including tuberculosis 30, typhoid fever 13.

GREAT BRITAIN.—Week ended January 27, 1912:

England and Wales.—The deaths registered in 77 great towns correspond to an annual rate of 16.5 per 1,000 of the population, which is estimated at 17,559,219.

Ireland.—The deaths registered in 21 principal town districts correspond to an annual rate of 22.3 per 1,000 of the population, which is estimated at 1,157,014. The lowest rate was recorded at Wexford, viz, 4.6, and the highest at Belfast, viz, 27.5 per 1,000.

Scotland.—The deaths registered in 18 towns correspond to an annual rate of 17.7 per 1,000 of the population, which is estimated at 2,182,400. The lowest rate was recorded at Falkirk, viz, 7.6, and the highest at Ayr, viz, 31.1 per 1,000. The total number of deaths from all causes was 740, including diphtheria 13, measles 39, scarlet fever 4, typhoid fever 4.

ITALY—*Genoa.*—Two weeks ended January 31, 1912. Population, 272,077. Total number of deaths from all causes 150, including diphtheria 2, measles 1, scarlet fever 1, smallpox 1, tuberculosis 59, typhoid fever 1.

JAMAICA—*Kingston.*—Month of January, 1912. Population, 52,000. Total number of deaths from all causes 183, including tuberculosis 16, typhoid fever 2.

PORTUGUESE EAST AFRICA—*Laurenço Marquez.*—Month of October, 1911. Population, 10,000. Total number of deaths from all causes 26, including tuberculosis 4.

RUSSIA—*Riga.*—Month of October, 1911. Population, 385,000. Total number of deaths from all causes 580, including diphtheria 10, measles 1, scarlet fever 31, smallpox 1, typhoid fever 5, typhus fever 2.

Month of November, 1911. Total number of deaths from all causes 560, including diphtheria 6, scarlet fever 14, smallpox 1, typhoid fever 10.

By authority of the Secretary of the Treasury:

RUPERT BLUE,
Surgeon General,

United States Public Health and Marine-Hospital Service.

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